

portable

100/200/600

TANDY BRIEFCASE COMPUTING

WORD ON THE 600

A writer's view

ULTIMATE ROM II

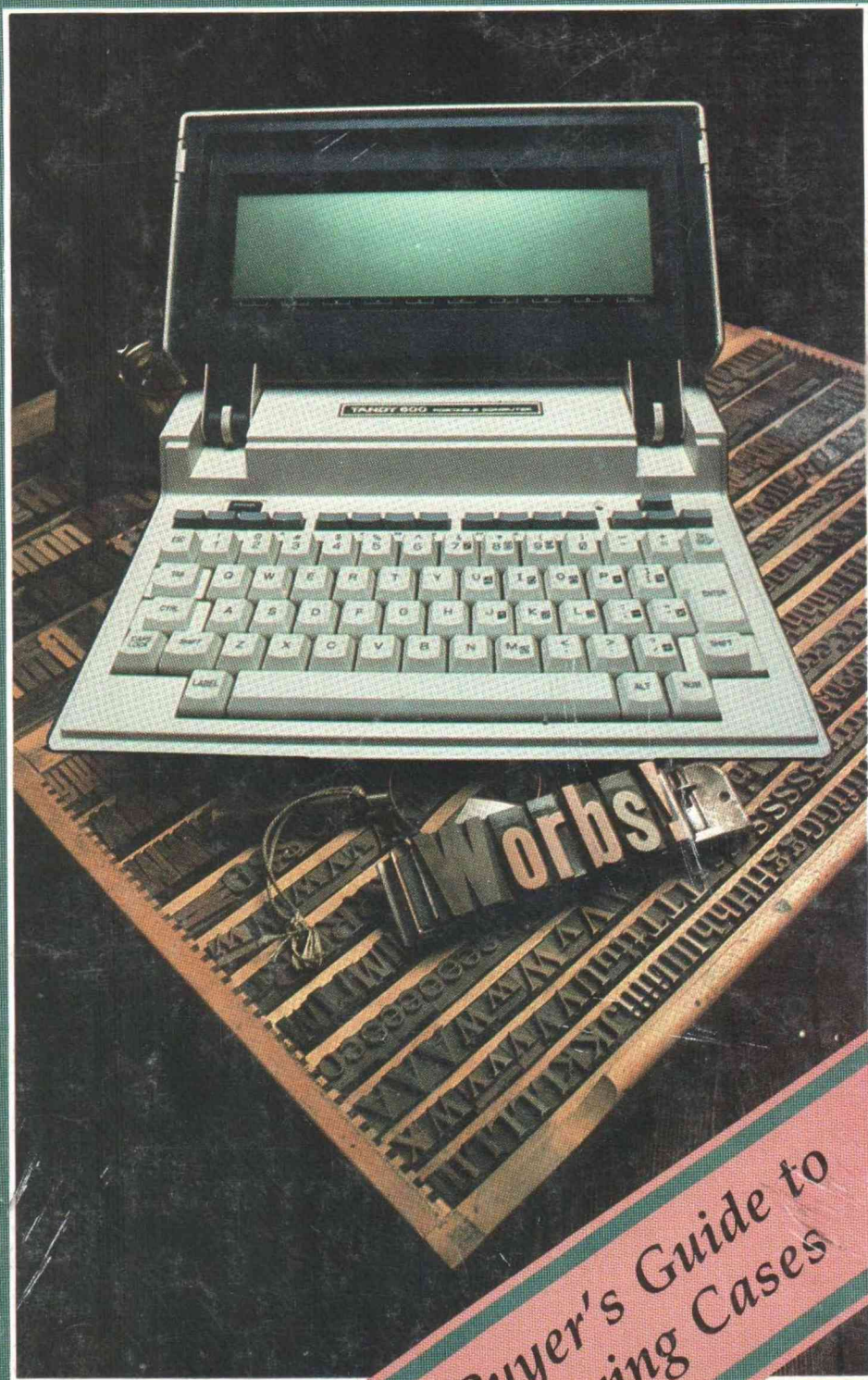
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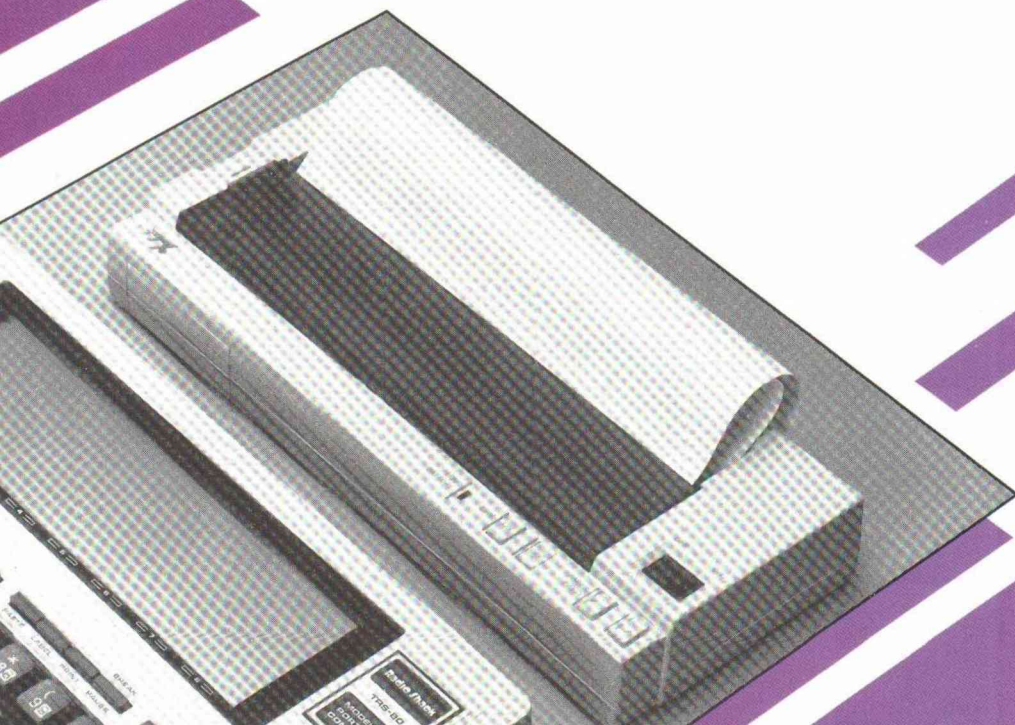
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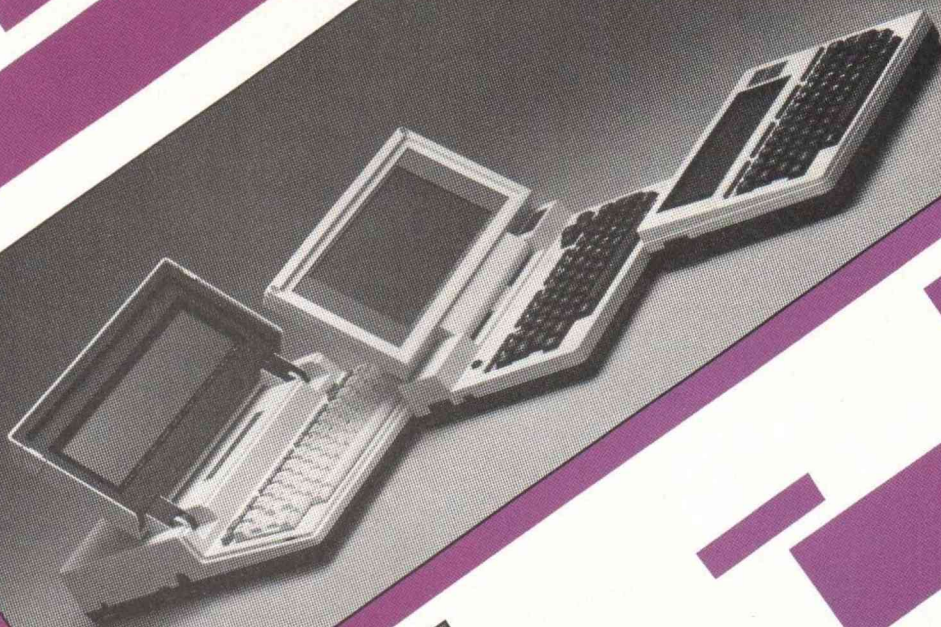
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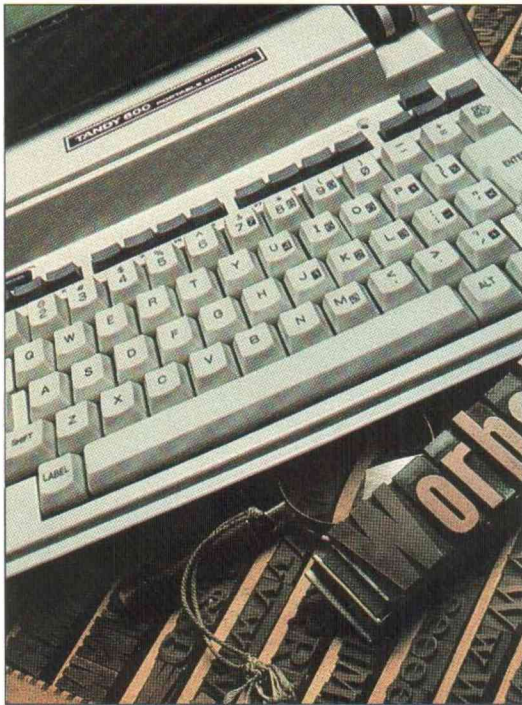
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portable

100/200/600

JUNE 1986

VOLUME THREE, NUMBER TEN



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Microsoft's word processor on the Tandy 600 is one writer's dream come true.

Cover photograph by Benjamin Magro and Kip Brundage

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TS-DOS is only \$69.95. If you own the Ultimate ROM II, or are purchasing it now, you can get TS-DOS at a \$20 discount. TS-DOS comes on a 3 1/2" disk and works automatically with the Ultimate ROM II or can be initially loaded using FLOPPY.CO with the Tandy Models 100/200 or by using a cassette drive with the NEC PC-8201.

THE SECOND BARRIER

Until now, the Tandy and NEC laptop computers were not easily used with IBM desktop computers. Traveling Software has broken this barrier with a product called "LAPDOS," which allows the Tandy portable 3 1/2" disk drive to be plugged into and used with any IBM PC or compatible with a serial port. LAPDOS can be operated as a RAM-resident utility on your IBM, which means you can call it up with two keystrokes while using your favorite word processor, spreadsheet, or other software. You could be in the middle of Wordstar, for example, and read in any text files from your portable disk drive.

LAPDOS allows you to easily use your database, spreadsheet, or word

processing files while on the road with your Tandy or NEC laptop computer. In fact, LAPDOS includes a program called "The Exchanger" which allows you to use ThinkTank and Sidekick files with the IDEAL outline processor available from Traveling Software on a software chip called The Ultimate ROM II.

LAPDOS is only \$89.95, which includes a special hardware adapter which allows the disk drive to plug into any IBM PC or compatible computer with a serial RS232 port. The LAPDOS software comes on an IBM 5 1/4" disk with a complete owner's manual. And if you already own the Ultimate ROM II, or are purchasing it now, you will receive a \$20 discount off the cost of LAPDOS.

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ROM WITH A VIEW

On Spring Fever and Computers

Once a month I sit in front of my Tandy 200 and think about what to put in this editorial. Sometimes inspiration comes to me in a flash. Other times, like now, I tend to sit and think and then think some more.

My mind tends to wander during these bouts of intellectualization. I start thinking about important things like what I'm going to do this weekend. Or if the Red Sox can pick up where the Celtics left off. With the weather warmer and the days getting longer, it's hard to keep my mind on computers. Some people may find it easy, but I don't.

When I experience these periods of editorial drought, I pack up my portable and head for the great outdoors. There's nothing like a nice shady tree and cool gentle breeze to get the old creative juices flowing. Ha! I bet the editor of *PC* can't enjoy a pleasant afternoon in the park with *his* computer.

FLASH TIME

Several people have called me recently to ask what I know about the Tandy 600. For example, is it selling? Is Tandy going to support it? Is anyone going to support it? Will it be around this time next year? Will it be around this time next month?

These are legitimate questions. Support is a very important consideration when buying a computer. Certainly no one wants to get stuck with a lemon and no way to fix it. When people don't see Bill Bixby strolling across their television screen with a 600 cradled in his arms, they get leery. They want to at least be assured that their computer won't be discontinued before they get it home.

Having followed the Tandy portable market for the better part of a year, I was embarrassed that I didn't know the answer to these questions. So I thought I'd do some digging to help put prospective 600 buyers' minds at ease.

I called Tandy. The folks there reminded me that it's not Tandy policy to give out sales figures (I really don't know why). I was told, however, that the 600 is selling "better than anyone inside Tandy expected." That certainly is a confidence booster. I know they've sold two in New York City and I talked to someone "on the brink" in Kansas City. Do you suppose that's what Tandy means by "better than expected"?

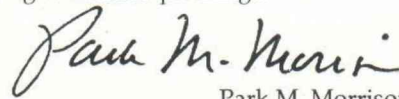
I asked if Tandy's going to develop any software for the 600. I had forgotten Tandy had specially bundled the 600's built-in software in response to what Model 100 and Tandy 200 owners said they wanted most in a portable. Once you have a powerful word processor, filer, calendar, modem package, spreadsheet and BASIC (not to mention a disk drive) — what more do you need?

At present Tandy doesn't have any plans to produce anything in-house for the 600. However, the people in Fort Worth did indicate they're in touch with two or three third-party types who are programming away. Who are they, what are they developing and when will it be available? I don't know; no one would tell me. But rest assured, software is on the way.

As for whether it will still be around next year, next month or next week, well, that's unfair to ask any computer company. Even IBM would have lost that bet with its PCjr. But if I had to guess, I'd say the Tandy 600 will be around for a while. Why? For the simple reason that people seem to like it. The only bad things I've heard about the 600 were from people who don't own one and seemed to be grasping for reasons not to buy one.

So if you're a prospective Tandy 600 purchaser, here are your answers. I know it's not much but it's better than an "I don't know."

Now then, if the Red Sox could get some right-handed pitching...



Park M. Morrison
Senior Editor

Now Playing

THE NEW CHIP ON THE BLOCK

STARRING: ULTIMATE ROM II

By Carl Oppedahl

Ultimate means the very last and the very best. So it seems strange that there could be an improved Ultimate ROM. But Ultimate ROM II is far better than Ultimate ROM (see *Portable* 100, October 1985), so the name is appropriate.

Traveling Software's Ultimate ROM II and its companion TS-DOS are significant new products for the popular laptops: The Model 100, Tandy 200, and NEC 8201.

Ultimate ROM II contains a text formatter, a database system, a thought outliner, an eighty-column display feature and a simple means of accessing TS-DOS; an enhanced disk operating system for the Tandy portable disk drive. TS-DOS itself is sold separately.

The Ultimate ROM II package contains a ROM chip, cassette tape and a big stack of manuals. The cassette tape has an audio introduction on one side and a set of sample files on the other.

Installation is quite easy. Simply snap the chip into the option ROM socket. I found that Ultimate ROM II's Molex carrier tended to bump into my Cryptronics 96K memory bank circuit board. I ended up trimming off the lifting tabs at either end of the carrier. Next you go to BASIC and type CALL 63012 — Ultimate ROM II (UR-2) appears as a selection on the menu.

With Ultimate ROM II everything is accessed via menus. Moving from one application to another is easy and smooth. Getting back and forth between Ultimate ROM II and built-in

applications such as TEXT, BASIC and TELCOM is also a snap. You go from menu to menu, tapping function keys and pushing the space bar to select files. At each menu there are clear legends and key labels.

The most successful integration of Ultimate ROM II with the built-in Model 100 and Tandy 200 software is the connection between T-Word and TEXT. T-Word is far better than its precursor T-Writer (see *Portable* 100, September 1985).

You select T-Word from the Ultimate ROM II menu. Displayed before you are the text files currently in memory. BASIC (.BA) and machine language (.CO) files are absent from the display.

You select a file by placing the cursor over it. You may then print, display a pixel-map or edit it.

If you choose to edit the file, you don't have to return to the main menu — just push a function key and there you are in TEXT.

Control keys have been added to T-Word to make editing easier. For example, CTRL-L provides a search-and-replace function. CTRL-J gives a byte count, word count and carriage return count. CTRL-O lets you toggle between insert

mode (the usual TEXT mode) and overwrite mode.

When you press F8 you return to the Ultimate ROM II menu rather than to the main menu. This generally saves keystrokes since the next thing you're likely to do is print a file or view a page format (pixel map).

When you're viewing pages through the page-plot feature,

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ULTIMATE ROM II

CTRL-A is supposed to get you into text with the cursor in the approximate area that was being viewed. This didn't always work for me; I would push CTRL-A and end up at the beginning of the file instead.

T-Base was reviewed in *Portable 100* in October 1984 as well as in the previous Ultimate ROM review (*Portable 100*, October 1985). However with Ultimate ROM II you get an enhanced version. The improvements include the ability to use string expressions and functions in text fields, faster operations, more math functions and floating point digits and conditional and logical operations. Also, menus are used to select files.

As noted in previous reviews, T-Base is a powerful relational database system. It allows files to refer to information in other data files. It's well suited for mailmerge operations. It can accept and generate comma-delimited files for interchange with other database programs and/or BASIC programs.

The latest version of Idea (an outline processor) on Ultimate ROM II also has some enhancements. These are described in a 13-page brochure included in the documentation package.

A couple of the new features are significant. For example, you can edit Idea notes directly without having to exit the program or go back to the main menu. When you finish editing you'll be back in Idea. When you enter Idea you don't have to type file names, but can now select them from menus.

ROM-View 80 is a better integrated version of Traveling Software's T-View 80 (see *Portable 100*, November 1985). As long as you don't mind setting aside three or four kilobytes (K) of random access memory (RAM), and don't want to run any other machine language programs simultaneously, it gives you a 60-column display from within TEXT, TELCOM or BASIC. You can configure it as a 60-column window on an 80-column file. By scrolling left and right you'll see all of the columns.

ROM-View 80 is not available for the Tandy 200, so TS-DOS is supplied instead.

Ultimate ROM II has a menu item called TS-DOS. This doesn't mean, however, that you get the disk operating system for Tandy's portable disk drive. Traveling Software carefully describes Ultimate ROM II's menu option as a "gateway" to TS-DOS. It lets you load TS-DOS from a disk with a single keystroke. When you select TS-DOS from the Ultimate ROM II menu the prompt "loading" appears. The next

thing you know, TS-DOS is running.

With TS-DOS loaded, you're no longer executing code from the option ROM socket (namely Ultimate ROM II), but rather executing a program in RAM. At least 5K of RAM has to be free for this to work. If you exceed this minimum you won't be able to use TS-DOS.

But the TS-DOS connection in Ultimate ROM II is nonetheless an improvement over using Radio Shack's FLOPPY.CO program since FLOPPY.CO must always be resident in memory and Ultimate ROM II only ties up RAM when necessary.

You get seven manuals with Ultimate ROM II. One manual gives an overview of Ultimate ROM II and an explanation of how to install it. There are very comprehensive manuals for Idea, ROM-View 80, T-Word and T-Base. Also included are supplements for Idea and T-Base.

Reference guides appear in the backs of most of the manuals. All are indexed except ROM-View 80's manual —

which doesn't really need an index. The writing style is clear and concise. The sample files (provided on cassette) and text examples are helpful to a new user.

A LOOK AT THE COMPETITION

How do you make a decision about which ROM to buy? The thing to remember is that most companies offer a 30-day money back guarantee. My advice is to try one for a month and if it doesn't suit your needs, send it back.

If you want integrated access to the portable disk drive, Ultimate ROM II is a good choice. If you want a spreadsheet, Super ROM is the one to use. But if you're doing primarily word processing or database work one may prove better than the other — only you can tell.

Ultimate ROM II is a powerful product with features not found elsewhere. Its documentation and customer support are very good. It may be the "ultimate" ROM for you. □

Also Starring: TS-DOS

First there was the Model 100 and its 29.5 kilobytes (K) of random access memory (RAM). Then there was the disk/video interface (DVI), an uninspired, expensive and decidedly non-portable way to store files on 5.25 inch floppy disks.

Finally came the Tandy Portable Disk Drive. It gives laptop users a small, simple, attractive and reasonably priced way to store files on popular 3.5 inch diskettes. These disks are ideal for users on the move since they require little if any physical protection and fit easily in a shirt pocket.

But that's the extent of the good news. The bad news is that FLOPPY.CO, the software that comes with the portable drive, is inefficient in its use of RAM and limited in scope.

TS-DOS from Traveling Software, a successor to FLOPPY.CO, lets you have some control over how memory is used with the floppy drive and allows built-in and BASIC programs to gain access to files on the floppy drive.

A brief refresher on Model 100 memory use illustrates the benefits of using TS-DOS. User files may reside in RAM between address 32768 and HIMEM. HIMEM may take any value between about 32900 and MAXRAM (usually 62960). When HIMEM equals MAX-

RAM, the user file area is as large as it can be. To use machine language utilities like FLOPPY.CO or TS-DOS, HIMEM must be set to a value considerably lower than 62960, reducing the amount of memory which may be used for files.

When FLOPPY.CO is being used, HIMEM is set to 59400, leaving only about 26.5K for user files. What's worse, if you follow Radio Shack's instructions you leave a copy of FLOPPY.CO in the user file area, consuming another 3.5K and leaving only about 23K for files. A Model 100 that once stored some fifteen pages of text can now store eleven pages. And that's not good at all.

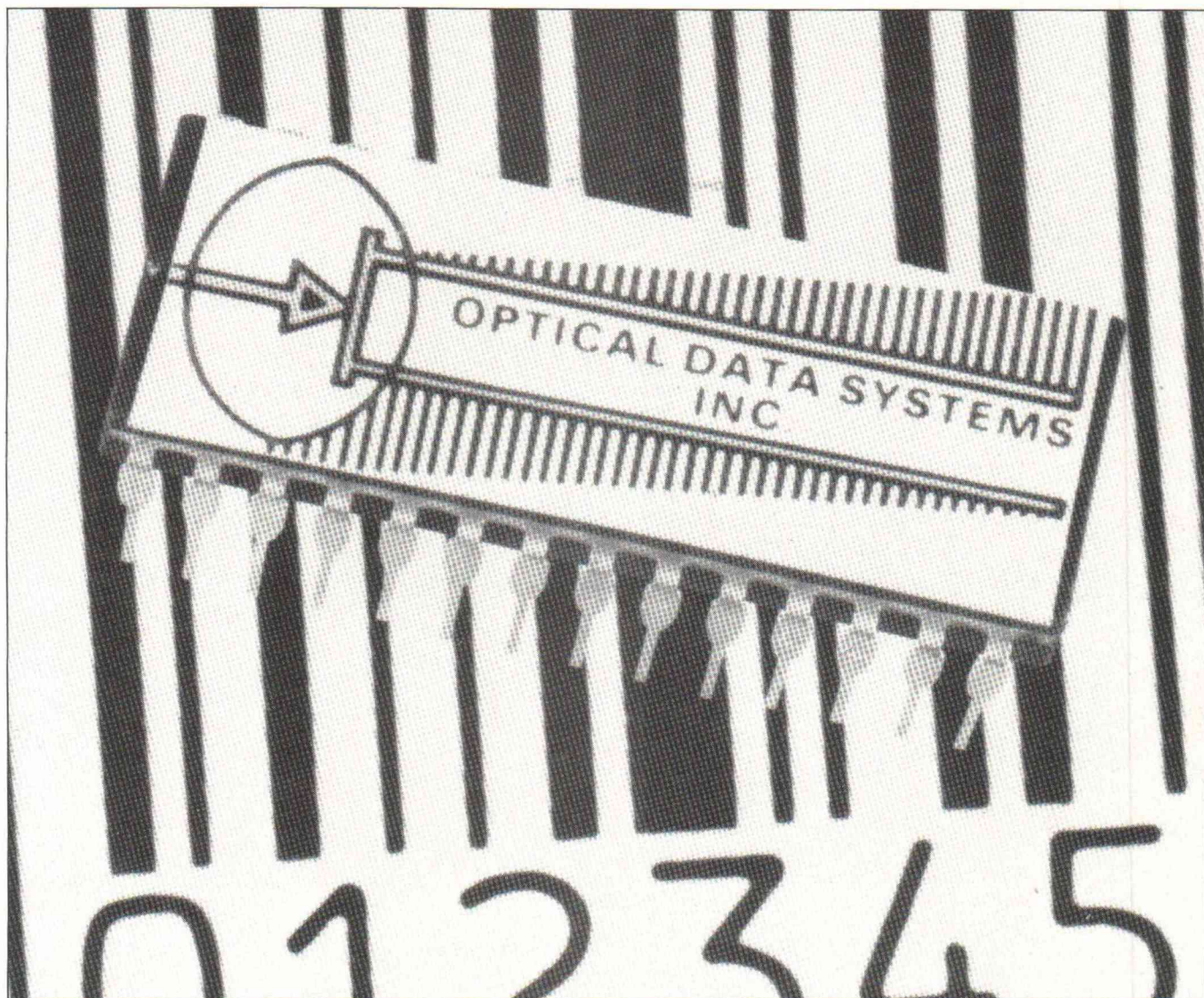
If you're lucky enough that the only machine language file you ever use is FLOPPY.CO, you can free up 3.5K of memory by killing FLOPPY.CO and creating a one-line BASIC program that executes FLOPPY. The one line is CALL HIMEM. However, you should be aware that this procedure is risky and may cause a cold start.

THE BENEFITS

TS-DOS gives you more control over use of memory. For example, the TS-

Text continues on page 56

Bar Code ROM



It was only a matter of time before the bar code people got into the act.

Optical Data Systems of Escondido, CA has introduced Bar Plus, a low-power CMOS ROM chip that turns your portable into a multi-purpose bar code system.

Bar Plus reads formats of many industry-standard bar codes, including LOGMARS, HIBC, AIAG, and UPC. It can also print some of these codes on Tandy's series of DMP dot-matrix printers.

Six application programs for recording transactions, working with pick lists, quality control, assembly line recording, information look-up and working with retail publications are also contained on the ROM. In addition, there's a built-in file manager and calculator.

Bar Plus runs on the Model 100 with a minimum of 24K of RAM. It sells for \$195. Optical Data also offers the MSH-510 bar code scanner which is compatible with most portable computers

with a bar code port.

Contact Optical Data Systems Inc., P.O. Box 1987, Escondido, CA 92025, (619) 745-6563.

Circle No. 81

Get Organized

Turn your portable into an organizational and record keeping tool. Stratiarius Software Production has an-

It's the Holmes Engineering/PCSG "chipmunk"

PORTABLE

Disk Drive

for the Model 100/200

NOW
AVAILABLE
ON
M-200

\$499

Includes a library of
six powerful programs

Uses the main menu concept. You see the disk directory instantly, arranged on your M-100 screen like your main menu. Just move the widebar cursor and transfer files with a function key. You can run a file directly from the diskette with the ENTER key. Uses 3½" microfloppy diskettes that have a rigid plastic casing and a metal core. They're tough and nonflexible. You can carry several in a shirt pocket without damage. There's 358K on a diskette. Ten of these in your briefcase and you've got 3½ megabytes.

Drive weighs only three lbs. and it works directly from the 110 outlet and recharges at the same time. It recharges in six hours with thousands of pages transferred between charges. It's compact, with dimensions of 2¼" x 5½" x 7.5"; and fits easily into your briefcase along with your Model 100 or 200.

Machine code programs, BASIC programs, *Lucid* files and documents all are saved and retrieved with no protocol—instantly, ready to run.

In a special association, Holmes Engineering and PCSG have worked together combining the hardware knowledge of Holmes and the software expertise of PCSG. The result is a product that can only be regarded as excellent.

You see the disk directory instantly; works just like the main menu

Here is what is really exciting. The portable disk drive has Random Access. Included as part of the operating system in the drive (ROM) is a very powerful disk BASIC.

This means that you can have BASIC programs that will access the diskette and read and write records directly on the diskette.

Just imagine yourself with this kind of capability.

Database—The portable disk drive stores your mailing list, inventory items, part #s and descriptions or any other data that you need to recall.

358K on a diskette

Invoice (purchase order)—At the touch of a button you can print out your sequentially numbered, professionally done invoices. This is truly professional invoicing capability.

Purchase orders are just as easy.

Sort—This excellent utility allows you rapid sorting of any records you have compiled. You can write the newly sorted list back in the same file on the diskette or to a new file.

Telecom interface—If you are a user that likes to access other computers or databases (for example CompuServe) by telephone then this powerful facility alone is worth the price of the disk drive. You can automatically download and upload information onto the diskette.

Calendar—Everyone who has seen this program has said, "This is the first calendar/

diary/scheduler on any computer anywhere that I can use. It is so functional."

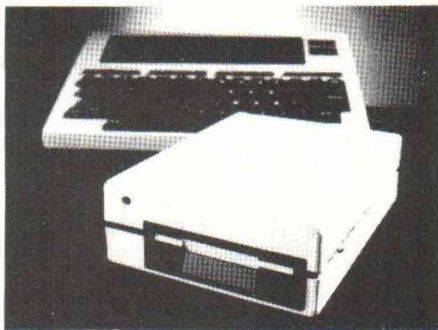
The calendar program is usable for two reasons, first it is designed correctly, and second you have the memory (358K) on the diskette to log and access a tremendous amount of notes over a long period of time.

Personal Finance Manager—This wonderful program truly lets you keep track of your finances.

All your records are kept on the diskette. Bank accounts (checking and savings) and charge accounts such as MasterCard and Visa.

We at PCSG believe we have the ultimate Model 100 system, the Portable Disk Drive plus the *Lucid* spreadsheet on snap-in ROM, *Write ROM* word processing and the new 64K RAM expansion now available from PCSG.

We want you to find out for yourself at no risk. If you aren't totally satisfied within 30 days, simply return the disk drive for a full refund. Priced at \$499.95, including the software library. MasterCard, Visa, COD.



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Circle 44 on Reader Service Card

NEW PRODUCTS

nounced Harmony, an integrated software package containing a project time tracker, multifunction alarm, memo to file function and calculator. All programs can be in use at the same time.

The time tracker is set by entering a job name or description. It keeps timing a job even if the user selects another program or the computer is turned off. When the timer is stopped the recorded time is displayed and written to a file.

You may set up to 20 alarms with Harmony's alarm system. Alarms may

be set to either clear after they go off or reset themselves for the following day. Messages are displayed with each alarm.

The memo to file function allows memos to be saved and later sorted and printed by job name, number, memo title or date of entry.

The calculator can be used for calculations to the screen or a printer.

Harmony is available for \$49.95. Contact Stradivarius Software Production, 1109 Gardengate, Garland, TX 75043.

Circle No. 83

Into Statistics?

American Technologies has introduced Statimate ROM; a full-featured data collection, analysis and reporting program for statistical process control.

Statimate ROM can manage up to 16 files, or characteristics, at one time. It can generate all standard control charts including: X-bar, modified limits, moving ranges, histograms, descriptive statistics and percent defective.

Statimate ROM prints all charts to the screen, and printouts of reports can

also be generated.

Computer requirement is a Model 100 with a minimum of 32K. Statimate ROM is compatible with Tandy and Epson printers as well as Tandy desktop computers.

Statimate ROM with Statimate and Disk Plus software on a 32K chip sells for \$495. Contact American Technologies Inc., 123 S. Jefferson St., Marshall, MI 49068, (616) 81-3014.

Circle No. 82



RS-232 Problems?

A new product from Craig Data Cable promises to be a solution to your RS-232 asynchronous interface problems.

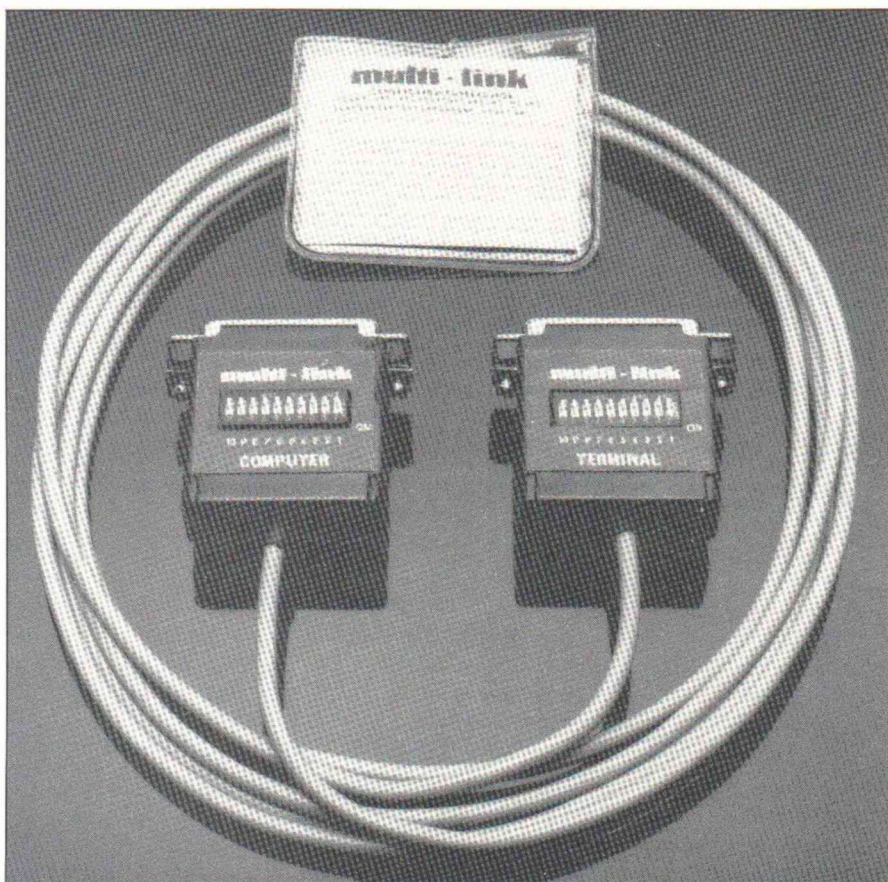
The Multi-Link User Programmable Interface Cable enables you to select configurations covering 95 percent of applications. No need to use a different cable for new equipment. Whether you're connecting a printer, plotter or modem, simply change the selectable switches to the proper configuration.

One cable can handle many different devices.

Standard cables have RS-232 male connectors on each end and are ten feet long. Available from stock for as low as \$19.95.

Contact Craig Data Cable Co. Inc., 652 Glenbrook Road, Stamford, CT 06906, (800) 243-5760. In CT: (203) 356-9315.

Circle No. 84



For DVI Enthusiasts

Introducing Personal Profile, a specialized database application with random access capability for storing customer lists, church rosters, school directories, employees, etc. on Radio Shack's Disk/Video Interface.

Personal File stores data on up to 719 records per disk. Each record contains fields for name, address, phone number, social security number, birth date and vocation among others. Records are stored alphabetically by

name in ascending sequence.

With a record displayed, a user can choose from three phone dialing (local, long distance within an area code and long distance outside an area code) and three printing options (full data, mailing label and Rolodex formats).

Personal Profile is available for \$25 from Software Systems of Atlanta, P.O. Box 4251, Atlanta, GA 30302.

Circle No. 85

Get Organized

The writing is on the electronic wall! If you've watched Compuserve's bulletin board for Model 100 users, you've seen these comments about TMPC, a program to manage "The Most Precious Commodity":

"TMPC is a unique approach to scheduling appointments and to-do's ... it is a superior product ... I have come to rely on it heavily ... and recommend it to anyone who really wants to use the M100 as a time management tool."

— Frank Rytell

"The silly thing actually improved my life! ... Deadlines used to be a real weakness of mine."

— Tim Peters

"I was shocked to find such a fine, professionally produced, well written manual accompanying a \$50 product."

— Bob Willard

"TMPC does indeed help me manage a **very** complicated schedule as a free-lance writer.... With my future spread out before me, it's hard **not** to plan."

— Greg Sandow

"To my mind, the best thought out program for the Model 100."

— Alex Jacobs

Isn't it about time you changed your life — for the better? Order TMPC today, or call or write for more information.

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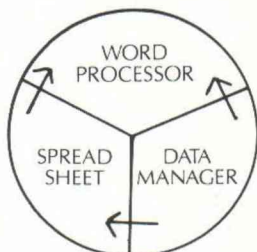
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■ **The Data Base** turns your Mod 100 into a personal filing system. You can store, examine, update select, sort and list a wide variety of information - from personnel records and inventory facts to appointment schedules and client lists.

■ **The Spreadsheet** turns your Mod 100 into a powerful decision tool. It is a full featured spreadsheet with 99x99 cells and provides fast decimal arithmetic in formula computation with complete range of scientific functions.

■ **The Word Processor** uses the Text editor of Mod 100 and gives you additional features for formatting and printing. You can set margins, line/para spacing, justify, define header/footer and use special print features like underline, **boldface**, etc.

MORE MEMORY Interactive Solutions does not occupy RAM memory, so frees your precious RAM for larger data files.

EXTRA CONVENIENCE Interactive Solutions plugs in the optional ROM socket. It is always resident and ready to work. You don't need to load programs from cassette recorder any more.

Interactive Solutions *integrates* all of your data information in Mod 100. With a touch of a function key, you can easily:

- Select and move items from **Data Base** files into **Spreadsheet** columns.
- Generate a report in **Data Base** program and move to the **Word Processor**.
- Cut any part of **Spreadsheet** and move to the **Word Processor**.
- Merge the items (like names, addresses) from **Data Base** files into a **Form Letter** and generate multiple letters or labels.

*All this and much more in
a 32K bytes ROM from*

DCM Data Products
1710, Two Tandy Center
Fort Worth, Tx. 76102
Tel: 817/390-2762



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1-2-3 is a trademark of Lotus Corporation.

Bring Back My Data To Me

Is there any way to close a file on the Tandy Portable Disk Drive that wasn't properly closed? My wife, who uses a Model 100, had the power fail as she was saving a file. Since it was listed on the file list, she assumed it was there, but she can't load it because of an I/O error. Is there anyway to retrieve it?

Sam Smith
Washington, DC

Those dreaded I/O (input/output) errors occur because the portable disk drive — and therefore the Model 100 — becomes confused. Writing data to a disk requires several separate operations, such as looking to see if there's enough space, making a space in the disk directory and actually saving the information. If the directory location was created, but the power died before the actual data was written to disk, you're in trouble. But if most (or all) of the data was saved but the directory wasn't completed, then you may be in luck.

As of this writing the folks at Traveling Software are in the process of developing a set of utilities for the Tandy disk drive, and presumably one of these will be able to close your open file. But, if any reader can provide a more immediate solution, we'd like to hear it.

—Ed.

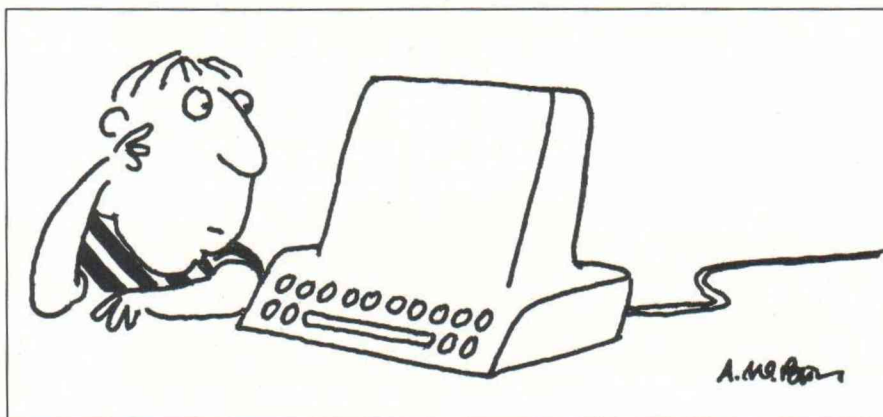
QUICK SUBSTITUTE

The February issue contained an article in Telcom entitled "Ring Detection" that explains in detail the hardware necessary to implement the software in the January article, "The Interactive Publication."

I intend to implement both, but I ran into a snag. I found that a key component in the "Ring Detection" article — the Optoisolator — has been discontinued by Radio Shack. What would be a suitable replacement?

Paul J. Silagi
East Hartford, CT

Just because Radio Shack doesn't carry optoisolators anymore doesn't mean nobody makes them. Virtually any common optoisolator will do. For example, one that works is the MCT-2 made by General



Electric. It's available for 90 cents from Digikey, (800) 344-4539.

—Ed.

NAVEASY UPDATE

The review of NavEasy (Portable 100, March 1986) had a few errors that I'd like to correct. The program is now \$299.95, the additional charts are \$24.95 and the computer sorted nav aids are \$1 each for the first 50 and 50 cents each thereafter.

While not inexpensive, NavEasy gives the same answers as Loran C for a lot less money. Many of our customers have become distributors and our money-back guarantee has yet to be exercised. They find that the Model 100 is an ideal form of avionics.

Guy D. Veasey
Eagle Air Services
Fullerton, CA

HOLLYWOOD HYPE

Thank you very much for the fine article on laptops in Hollywood (Portable 100, February 1986).

As the designers of Log-It 100, one of the programs described, we would like to expand on some of the points made in the article.

While both Log-It 100 and CCR Video's program are described primarily as post-production tools,

either program could be used for location logging and taking script notes. Additionally, Log-It can operate as a time code reader with any longitudinal time code source.

While Log-It 100 can be physically connected to any VTR for perfect accuracy, this is in no way necessary for operation of the program. Log-It 100 can be used in a manner similar to CCR's program (i.e. completely portable) and without resetting the Model 100's clock.

As all Model 100 users are aware, the computer has limited storage capacity. The Log-It program uses only 256 bytes of that precious memory.

We feel that Log-It 100 has numerous other advantages. Our program and users speak for themselves.

Abby Levine
Barry Minnerly
Palomar Software

I LOVE MY RADIO SHACK

I keep reading letters in Portable 100 about how Radio Shack personnel aren't knowledgeable and readers complain about bad service. Recently I read a letter about a customer having problems with the service department refusing to remove an "alien" memory chip.

I would like to share my experience. During the past couple of years I've purchased a Model III, Model 100 and Tandy 1000 from three different Radio

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- | | |
|-----------------------|-----------------|
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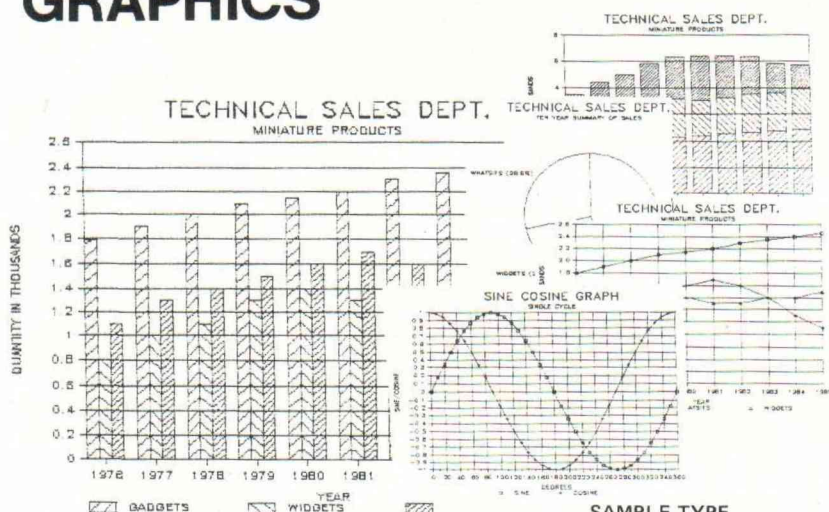
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AND HALF WIDTH : 1234567890 ABCDEFGHIJKLMN

BIT ADDRESSABLE GRAPHICS

Character set includes 129 ASCII and Int

!"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJ
KLMNOPQRSTUVWXYZ[\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~**ERGO Systems, Inc.**

303-3 Convention Way
Redwood City, CA 94063

GIGO

Shack stores. The personnel has always gone beyond the call of duty to answer any question I may have.

I ordered Disk Plus from Portable Computer Support Group (PCSG) and couldn't get the ROM chip to work. I presumed the problem was in the chip and returned it to PCSG. There was nothing wrong with the chip so I took my 100 to the local Radio Shack repair center. They discovered a bad ROM receptacle. They replaced it and even tested the PCSG chip to make sure it was working properly. I had a PG Electronics memory expansion installed at the time and no one ever asked me to remove it.

So there you have it. Happiness is dealing with Radio Shack. Incidentally, one of the reasons why I've dealt with Radio Shack is that I'm a minister and am transferred every five to seven years. Wherever I go I know I won't be far from support for my computers. I'd hate to have only an 800 number to call.

Paul D. Gates
Adrian, MI

ME TOO

My first portable was the Hewlett Packard 41-C. I have only praise for this machine. But because I work in the Washington, D.C. area the occasional maintenance was too time consuming.

When I decided to graduate to a more powerful portable I gave much thought to the availability of advice and service. I chose the Model 100. I've never regretted the decision. Whenever I have a problem I walk to the local Computer Center where the manager has always met my needs promptly and efficiently.

Olivier de Messieres
Boyd, MD

ANOTHER OPINION

In your February issue, John Wellsman commented on problems with Radio Shack service. As much as I like my Model 100, my experience has been that with Tandy, product support ends when you walk out the door.

In addition to the Model 100, I own a Tandy DMP 105 printer. It's supposed to operate with sheet paper and continuous form regardless of how the computer is programmed, but when using sheet paper it continues to feed until the paper reaches the sensor, and then stops. In order to satisfy the computer and release it from the printing mode, I have to feed in another piece of

paper and cycle the form feed or flick the on/off switch. In other words, it thinks it's always using continuous form paper.

I also experienced a problem with loading and killing the Spectaculator program on the Model 100.

The Radio Shack store couldn't help me but suggested that I contact a local support group. I contacted three. From them I got a temporary fix to the printer problem but no help with Spectaculator. All suggested I call Tandy in Fort Worth (not a toll-free call). I spent a total of three weeks trying to get through — the line was always busy.

I finally wrote a letter to Tandy concerning my problems. No answer. I wrote again. It's been seven weeks since my second letter, still no reply.

I'm certainly glad my investment in Tandy equipment is minimal. I was told (at Radio Shack) that Tandy offers the best support in the business. From my experience that translates to no support.

Carl Carlsen
Santa Paula, CA

MEMORY SAVER

I've just started using the Tandy Portable Disk Drive with my Tandy 200. I have the FLOPPY.CO program stored in two places. Do you have any tips on how to save memory?

David Line
Missoula, MT

If you read contributing editor Carl Oppedahl's review of Traveling Software's TS-DOS in this issue you'll find that FLOPPY.CO is big and it doesn't use memory efficiently. There's not much you can do about its size and efficiency — except use a different operating system.

—Ed.

PRICE CORRECTION

We appreciate the mention of our book *1-Hour Telecomputing* in your January issue. I would like to point out that this title sells for only \$9.95 instead of the higher price mentioned. Thank you for the opportunity to point out that our book offers more for less.

Thomas Wnorowski
IM-Press

Contact IM-Press, 1412 Rosewood, Ann Arbor, MI 48104, (313) 761-2231.

—Ed.

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A&J Micro Drive would like to announce its new portable System 100. This mass storage system, designed for the Radio Shack Model 100, offers high speed storage for the price of a cassette.

The System 100, with electronics and software designed by A&J Micro Drive, uses the latest Micro Wafer Technology developed by Entrepo Inc. The new system combines high speed digital electronics with low cost, high performance Micro Drive Technology.

INTERESTED . . .

The 100's compact operating system is smaller than that of the Radio Shack Disk Drive. The latest release of the operating system may be down loaded by calling the computer at A&J Micro Drive using the simple instructions included with the unit.

The System 100 may be small enough to fit into a corner of your briefcase and require only 4 "AA" -size batteries for months of use — but don't be fooled, our new unit is packed with state-of-the-art electronics. It will give you ultra reliable program loading as fast as the disk, and twenty times faster than the cassette.

The System 100 uses a miniature endless loop tape cartridge called a Micro Wafer. The Micro Wafer, approximately the size of a credit card, is completely enclosed in a protective housing. A built-in cover retracts as the tape is inserted into the drive, exposing the video-grade digital magnetic tape to the read/write head. Micro Wafers come in several lengths, allowing the customer to choose the length best suited to his application.

STILL INTERESTED

The price of \$89.95 includes a drive system with cable attached, one Micro Wafer, operating instructions and one-year membership to the A&J Bulletin Board.

Manufacturer's Specifications

System 100
A&J Micro Drive
1050 E. Duane Ave. Ste "I"
Sunnyvale, CA 94086
(408) 732-9292

Price: \$89.95

Baud Rate: 14,000 bits/second
Tape Speed: 10 inches/second
Capacity: 1.5K bytes/foot tape
10' = 15K bytes
62' = 100 K bytes

Lengths: 10, 20, 35, 50, & 62'
Power Supply: 4 "AA" cells
Connection: Uses RS-232 port
Cable: 30 inch RS-232 attached
Size: 6 x 4 x 2.5 inches
Weight: 24 ounces

Spreading Your Wings

Learning what a spreadsheet can do for your business.

By G.N. Gilbert

I consider myself somewhat of a spreadsheet aficionado, having been weaned on one of the first versions of VisiCalc. When the Model 100 appeared, I was one of the first to buy one. After about a month of playing with it, I felt the one thing missing was a good spreadsheet. I set out to find one, and my quest led me to buy all the spreadsheets currently on the market; I even downloaded some from bulletin boards.

Unfortunately, all left me disappointed — until I bought Lucid from Portable Computer Support Group (PCSG). Lucid is a very powerful spreadsheet, and it consumes very little of the Model 100's random access memory (RAM).

Most articles about spreadsheets show very elementary applications that would be used by readers who are employed in the loan business or who collect recipes as a hobby. This article marks the first in a series about practical spreadsheets for business use on a day-to-day basis. The examples that accompany the articles are currently used in the daily operation of a manufacturing company. The names and numbers have been changed for obvious reasons.

We'll begin with a couple of simple, straightforward spreadsheets for tracking and aging accounts receivable and accounts payable; eventually moving on to product pricing and financial statements.

FORMATTING THE SPREADSHEET

To begin with, let's set up some basic formatting rules for spreadsheets. In the upper left-hand corner, cell A1, *always* type in the name you'll use when you save the spreadsheet. This is extremely useful when you have many spreadsheets saved to a disk.

First, let's create a blank master form for each of our spreadsheets. At the beginning of each month we'll load the master and change the name (in cell A1) to reflect the current month. Once we've entered our data, the spreadsheet can be saved under the new

SALES JOURNAL				
Month of Jan				
INV DATE	CUSTOMER NO.	CODE	SALES	C.
01/05/86	CUST 1	11	1	55.00
01/10/86	CUST 2	22	2	35.00
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ACCOUNTS RECEIVABLES		
Aging by Customer		
AGE	TO	30

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version works
over the phone!

Disk +

on Snap-In™ ROM

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ON
M-200

Try Disk + for 30 days. If you aren't as excited as we are, return it for a full refund.

When we designed *Disk +* we did it out of necessity. We wanted a way that we could just connect a Model 100 to our desktop computer with a cable and save files onto the desktop's disk drive. We wanted it to be so simple to use it would be self-explanatory.

Picture this. *Disk +* comes to you on a Snap-in ROM and a diskette for your desktop. You take a quarter and open the little compartment on the back of your Model 100. Then you just press the ROM into the socket. *Disk +* appears on your main menu just like a built-in.

You connect your Model 100 to your other computer using an RS232 cable (available from PCSG for \$40).

You just place the *Disk +* diskette into the desktop's drive and turn on the computer. It powers up automatically and says "awaiting command" on your desktop's screen. Then you just put the widebar cursor on the Model 100 main menu on *Disk +* and press ENTER. You are shown your RAM files arranged just like the main menu.

To save a file to your other system's disk drive, you just move the widebar cursor to the file you want to save and press ENTER. It is saved instantly with no further action.

To look at the disk directory, you just press a function key on your Model 100. You see immediately the disk directory on your Model 100 screen, and it is arranged just like your Model 100's main menu.

To load a file from the diskette to your Model 100, you just move the widebar cursor to the file and press ENTER. The file is transferred to your Model 100's RAM instantly. You can press F8 and go back to the main menu, and the file you loaded from diskette is there, ready to use.

It is so nice to be able to keep your documents, programs (both BASIC and machine code) and *Lucid* spreadsheet files on the diskette, and bring them back when you need them. All files are ready to run or use with no changes or protocol by you.

If you have access to a desk- top computer and don't have *Disk +*, then evidently we have done a poor job telling you about it.

All files and programs that you load or save, go over and come back exactly as they are supposed to be because of full error checking. This guaranteed integrity is really a comfort. *Disk +* is wonderful in so many other ways. For example, you can do a "save all" of all your RAM files with just a touch of a function key. That group of files is saved on the diskette under a single filename with a .SD (for subdirectory) extension. Any time you want, you can bring back all those files at once, or just one or two if you like, again with one-button ease.

Disk + takes up no RAM. That's zero bytes either for storing the program or for operating overhead.

What really excites most *Disk +* users is text file cross compatibility. Your Model 100's text files are usable on your desktop computer, and your desktop's text files become Model 100 text files.

This means you can write something on your Model 100, and with *Disk +* transfer it

instantly to your desktop and start using it right away on your bigger computer. Or the way we like to work is to type in a document on the desktop computer and then transfer it to our Model 100 with *Disk +*. Then we print out the document, beautifully formatted, using WRITE ROM.

Disk + works with just about every micro sold, from IBM PC and its clones, to all Radio Shack computers (yes, all), to Apple II, Kaypro, Epson and most CPM. Just ask us. More than likely, your computer is supported.

Incidentally, hundreds of Model 100 owners have gone to their Radio Shack stores and bought a color computer because it is so low priced, and with *Disk +* they have an inexpensive disk drive.

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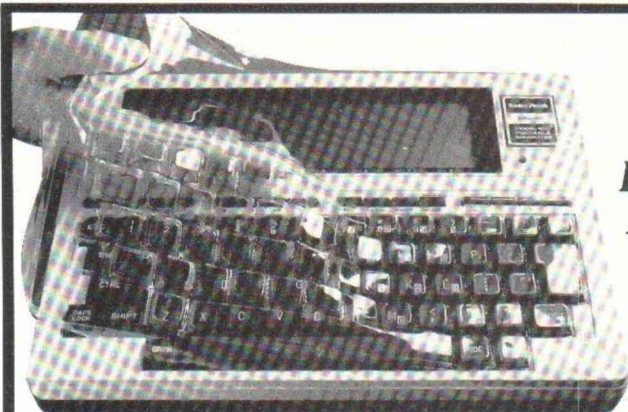
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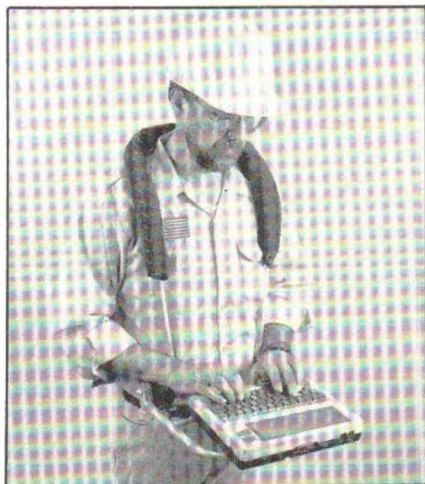
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SPREADSHEET

name, leaving the master blank and ready to be used again. Let's use the title MSTRAR for master accounts receivable.

In cell B1 I always type my initials as

**We send out
progressively
adamant
letters.**

the designer of the form and the initials of the person that I know will be using it. This will help later if there's a problem in the logic of the spreadsheet.

The next important input is the date the report is printed. Lucid allows us to move to a blank cell, press Edit (F1) and then Control D. This automatically places the current date in the cell (provided your Model 100 date function is set correctly).

Assuming this report will be passed throughout your company, we'll need a title that explains what it's all about. I usually enter this after completing the layout of the spreadsheet. The reason is quite simple: At this point we're not certain how many columns will be used nor the width of each column. The title should be centered and we can't figure that out until we know the width of the spreadsheet.

WHAT'S COMING IN

Our first spreadsheet will be an accounts receivable aging report by company and invoice. Let's begin by listing the headings we'll need:

Customer
Invoice Number
Dollar Amount
Age of Invoice
0 to 30 days
31 to 60 days
61 to 90 days
Over 90 days

Because our terms are net 30 days, we become concerned when the age of the invoice reaches 31 days or older. Between 45 and 60 days we send out a letter to the customer reminding him that he's late. Because we send out three progressively adamant letters, we'll want to know first that a letter was sent, and secondly which one. We'll need to add a column at the end

SPREADSHEET

of our list to designate this.

This brings us to a total of nine columns. Assuming each column is nine characters wide, that's 81 characters. Standard 8 1/2 by 11 inch paper is 85 characters wide. That leaves virtually no margin. Personally, I don't like reports printed on 11 by 17 inch paper if I can help it. My solution is to use condensed type which gives me 132 characters on standard-size paper.

The following list is how wide I feel the columns must be.

Customer	15
Invoice Number	5
Dollar Amount	10
Age of Invoice	4
0 to 30 days	10
31 to 60 days	10
61 to 90 days	10
Over 90 days	10
Letter sent	3
Total	77

When you type headings that start with numbers, use either the single or the double quote. This tells Lucid that

**Lucid is
a very
powerful
spreadsheet.**

the number isn't really a number. The single quote left-justifies, the double quote specifies a label and the caret (Shift 6) centers the heading within the column.

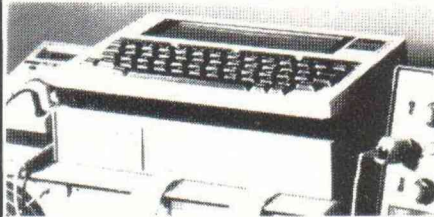
Now we can type in the title of the report. The title I've chosen is ACCOUNTS RECEIVABLES on the first line and AGING BY CUSTOMER on the second. To center the title, we divide 77 (the total character width) in half, getting 38. This is the center of the spreadsheet. The top line is 20 characters long, half of which is 10. Subtract 10 from 38 and the first title line begins at character 28. The second line is 17 characters long, half of which is 8, so this line begins at character 30.

ACCOUNTS RECEIVABLES & PAYABLE

It's important to note that the aging report we'll create is basically the same for both accounts receivables and payables. To make up a master accounts

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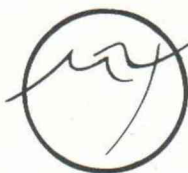
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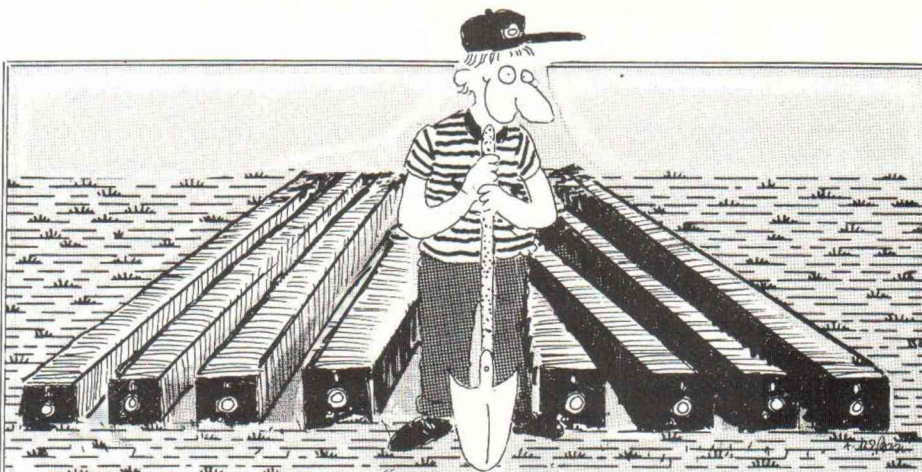
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ACCOUNTS							
AGE							
01/01							
01/1							
01/1							

payable, copy the receivables master and simply change the word *receivables* to *payables* and *customer* to *supplier*. The column labeled *invoices* would be changed to *purchase orders* and the last column (LTR) should be dropped altogether. The formulas we'll be developing will be the same for either application.

Let's look at how the program will work once we've entered the formulas. All we need to do is enter the customer name, invoice number, amount and the age of the invoice. After a series of invoices are entered, pressing F2 (Calc) will input dollar amounts in the proper columns.

To do this we're going to fool Lucid. We'll ask it to do a test using relational operators. Logical and relational operators are only available to those that have Super ROM. If you have Lucid now, PCSCG will allow you to trade in your old version and get Super ROM for \$100.

Now for the formula. In column J, out of our printing range, type in the number 30 in cell J1, 60 in J2, 90 in J3 and 91 in J4. Move your cursor to the first

SPREADSHEET

cell in the column you've labeled "0 TO 30 DAYS" — column E in this example. Skip a row below the heading and type in the following formula:

$+(J1=D^*)&(J1<D^*)+C^*$

where "*" represents row number.

According to Boolean algebra, if both operands are true then the result will be true. What the formula is saying is that if J1 is equal to the age in cell D*, print the amount from cell C*. If it's not, then print zero. Lucid is now capable of making a decision.

For the next column "31 TO 60 DAYS," change J1 to J2 and repeat the formula. For the column labeled "61 TO 90 DAYS" use J3 and J4 in the next. Remember to leave D* and C* constant across the row.

In order to replicate the formula down a column, you'll need to keep J1 through J4 constant while letting the other variables change according to row number. To do this type a \$ in front of the letter J and inside the parentheses.

Once you've input formulas for each of the rows you'll need, go to the bottom of the page. Remember, each spreadsheet will be used for a single month, so the chances are you won't need to use rows beyond 55. Move your cursor to column A and type in the row heading "TOTAL A/R." Go to your column titled "AMOUNT" (C in this example) and total the column using the formula $+SUM(C:C^*)$ — again,

**The flash
report is a
weekly
summary.**

"*" represents row number. Repeat this for all the aging columns (in this case E, F, G and H). Make a note of the cell location for each total; you'll need it later in the flash report.

SALES JOURNAL

The Sales Journal is used solely for recording sales of merchandise on account. If you're a manufacturer you'll also record the cost of sales in the same journal. Most companies post each invoice at the time it's written.

Our example is going to have 11 co-

Text continues on page 58

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The Art of Compression

Lap Coder is a nice program for people who do a lot of text processing. It lets you compress typical text files by about one third, thereby increasing free memory space. It does this by converting common letter sequences into characters with values above 127 (CODE and GRPH characters). Compressed files can be saved to tape or disk, or transmitted by modem.

Besides packing and expanding text, Lap Coder contains a keystroke text file Kill function and a text file length counter.

According to Mu-Psi, all versions of the program are about 660 bytes long; the Model 100 version reviewed here was 651 bytes. In addition to the Model 100, Lap Coder runs on the Tandy 200, NEC 8201 and the Olivetti M10. An IBM compatible version is available for expanding packed files transferred for a laptop.

The version reviewed here is number 2.0 for the Model 100. This revision contains several improvements over the original Lap Coder. If you have an old version, it will be upgraded for free.

WHAT YOU GET

The Lap Coder package contains a cassette tape and an instruction manual. Though Lap Coder is a machine language program, it's loaded as a BASIC file in case you want to load the LAPCOD.CO file above or below other machine language programs. The .BA file allows it to be relocated, thus avoiding address conflicts with other software.

Lap Coder doesn't use system memory hooks so there's no need to "de-install" the software. It's unlikely Lap Coder will destroy your files. It can be used in conjunction with the Tandy Portable Disk Drive's FLOPPY.CO without problems.

The 12-page manual is well written. No phone number is given for software help but a program as straightforward as this is unlikely to need phone support. My test call to their sales phone number reached an answering service. I figured I'd never get a reply. But before the day was out I got a call back

from someone who was able to answer all my questions. Excellent service considering Mu-Psi is a small company.

When Lap Coder is running, the names of all text files in memory are displayed. Move the cursor to the file you want to compress, expand or kill, and press the appropriate function key. When a file is packed the extension is changed to .DP.

If there isn't enough memory available for a compressed file to be fully

Lap Coder
Text compression program
Mu-Psi Computer
Consulting
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#250
San Diego, CA 92109
(619) 488-2350
\$29.95
Circle No. 142

expanded, the number of bytes needed to expand the file will be displayed and the file will remain compressed.

It's important to note that not all text is compressed equally. Since numbers and upper case letters aren't packed, address and Telex files (all upper case)

will shrink only slightly or not at all.

The program has several strong points. For one thing, it's possible to cut and paste compressed text into a non-compressed file, or to type into a compressed file and then expand the resulting file.

How much memory does Lap Coder effectively add to your 100? The advertisements say up to 50 percent, but the actual results depend on how you use the machine.

Here's how Mu-Psi comes up with its figure. Fill up the Model 100's memory with a text (.DO) file. With MAXFILES set to zero and Lap Coder in high memory (HIMEM set to 62309) such a file could be about 29,000 bytes long. Compress it and the new length (assuming the file is mostly lower case letters) is one-third the size of the original or 19,333 bytes. Now create another file and type until you get a memory full message. Compressed, this file will be 6,444 bytes leaving you with 3,222 free. Create another file, type until you get the memory full message ... well, you get the idea.

The first file, if expanded, would be 29,000 bytes long. The second would be 9,666 bytes, the third 3,222 bytes and so on. Each file is one third the size of the previous one. You may recognize the

Text continues on page 61

Lap Coder is a nice program for people who do a lot of text processing. It lets you compress typical text files by about one third, thereby increasing free memory space. It does this by converting common letter sequences into characters with values above 127 (CODE and GRPH characters).

Lap Coder is a nice program for people who do a lot of text processing. It lets you compress typical text files by about one third, thereby increasing free memory space. It does this by converting common letter sequences into characters with values above 127 (CODE and GRPH characters).

Before and after. The paragraph on top is 353 bytes long. After being compressed with Lap Coder it's 233 bytes.



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The four best programs for the Model 100 all on one ROM. 32K of power without using any RAM for program storage. This is the PCSG Snap-In ROM that just presses easily into the little ROM socket in the compartment on the back. You access the four right from the main menu like built-ins.

Write ROM — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. FORM lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit ... sur-

passed our highest expectations for quality and clarity."

Lucid Spreadsheet: This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

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Circle 41 on Reader Service Card

In a Word: Wonderful



Microsoft's word processor on the Tandy 600 is one writer's dream come true.

By Jim Hughes

Forget the hard-to-read screen. Forget about the need to carry a pound-and-a-half battery charger, turning a 9.5-pound baby computer into an 11-pound butterball. Forget about the slower-than-molasses disk drive.

The Tandy 600 comes with Microsoft's Word built into its compact dimensions. For me, that virtue alone is worth the price of admission. This special laptop version of Word is the equal of many desktop word processors, and in some respects is better than most.

The biggest problem with the Tandy 600's version of Word is not in the program itself but in the alleged instruction manual. It's as difficult to understand as the program it tries to describe is easy to use. For example, in typically daunting fashion, the manual lists six "text scrolling keys," and 13 "text selection keys."

My first instinct was to look for a description of the arrow keys. In the Model 100's manual arrow keys are called, logically, "cursor control keys." There's no such category in the Tandy 600 manual. And although two of the

four shift-arrows and all four control-arrows are listed as "text scrolling keys," the arrow keys alone are included only under "text selection keys."

For example, the left-arrow is defined as follows: "Selects the next character to the left when used with Extend Select [F-6]." Function Key 6, in turn, "Extends the current selection (high-lighted text). F-6 works in conjunction with the selection keys: F-7, F-8, F-9, F-10, and the arrows. 'Ex' appears on the status line."

Confused? So was I until I learned to read between the lines of this inarticulate manual. When using the left-arrow *without* pressing F-6, for instance, the cursor simply moves one character to the left without "selecting" anything — an essential word processing function that the manual simply neglects to mention. It also fails to list two essential text scrolling keys: Shift Left-Arrow and Shift Right-Arrow, which respectively move the cursor one word to the left and right.

Function keys F-7 and F-8 do almost the same thing as the Shift-arrow sequence. The difference, however, is important. The Shift-arrow combina-

tion will auto-repeat, allowing rapid movement through text; the function keys will not — but this distinction is not documented.

Microsoft Word
Built-in word processor for the Tandy 600 Tandy Corp.
One Tandy Center
Fort Worth, TX 76102
Circle No. 141

Either way, the word "selected" is shown in reverse on the screen. Now you have a choice. You can press Delete (Shift Backspace) and make all the selected text disappear, putting it in a paste buffer which Microsoft calls "Scrap." Or you can "unselect" the text. Although the manual says this can be accomplished by pressing an arrow key, it's even easier than that: just start typing and the reverse video reverts to normal.

While the manual never suggests it, all the so-called selection keys are similarly double-barreled. So, in addition

to the arrows, here's a list of cursor movement keys, some of which Tandy never bothered to list:

- Shift Up-Arrow: Scroll to the previous screen, with a two-line carryover.
- Shift Down-Arrow: Scroll to the next screen, with a two-line carryover.
- Shift Left-Arrow: Jump to previous word.
- Shift Right-Arrow: Jump to next word.
- Control Left-Arrow: Jump to beginning of line.
- Control Right-Arrow: Jump to end of line.
- Control Up-Arrow: Jump to beginning of document.
- Control Down-Arrow: Jump to end of document.
- F-7: Previous word.
- F-8: Next word.
- F-9: Beginning of sentence.
- F-10: Beginning of paragraph.
- Shift F-7: Previous sentence.
- Shift F-8: Next sentence.
- Shift F-9: Beginning of line.
- Shift F-10: Beginning of document.

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Circle 14 on Reader Service Card

WORD PROCESSING

There's no need to memorize any of these. Pressing the Label key, Shift-Label or Control Label will display the appropriate function key definitions on the screen. Indeed, there's little need to commit anything to memory in order to use Word, which is perhaps its greatest asset. One of my gripes about WordStar, a program built into a number of other laptops, is that its command structure requires the user to learn a multitude of complex control-key sequences.

I already use another writing program on my desktop — Perfect Writer — whose equally complex commands I've memorized. But like any computer, my brain has a limited amount of memory available. For those of us who already own, are happy with and plan to continue using desktops, the Word as implemented in the Tandy 600 is an easily mastered servant that will not conflict with your present writing program.

For example, say you want to search your copy for a word or phrase. Simply hit Escape (to "escape" the current mode — what could be more logical?), then type the letter S (for Search). Then just answer the prompts that appear at

the bottom of the screen and, when finished, hit Enter (which I will forever call the Return key) to return to the Edit mode.

The same procedure is followed for the other 10 commands on the one-line menu that's always visible — even while you write. To Copy, Delete, Edit, Format, Insert, Jump, Merge, Print, Replace or Search, just hit Escape and then the first letter of the desired command.

The eleventh option, called Options, gives you a couple of interesting choices: use of a ruler at the top of the page which provides a constant reminder of any page format you've chosen, and an option for setting tab stops.

With Options, you can also toggle between the traditional "insert" (character typed to left of cursor) and "overwrite" (character typed under cursor) modes. You can even dispense with the new line and paragraph symbols that normally appear on the screen.

The Copy and Delete commands work essentially the same as Copy and Cut on the Model 100. The main difference is that there are many more ways to select the words you want to copy or

delete on the Tandy 600. Whichever commands you invoke, the text selected ends up in a file called Scrap. The first few words will be shown at the bottom of the screen enclosed in curly brackets.

You can insert the contents of Scrap anywhere you choose. Just put the cursor where you want it — in the current file or even in another file — and invoke the "Insert" command.

The cursor can be relocated in any of several ways. You can use one of the cursor control keys — an arrow or function key — and do it visually, or you can use the Search, Replace or Jump commands to do it in a more abstract manner. If, for example, you know the phrase you want to insert Scrap into, use Search. On the other hand, if you'd like to replace a word with Scrap, Replace will do it for you in an instant.

But perhaps you only have an approximate idea of where you want to put your now homeless words. In that case, use Jump. In a document that has been printed already, or repaginated, you can jump forward or back to a specific page. Lacking pagination, however, you can use the useful Jump-%

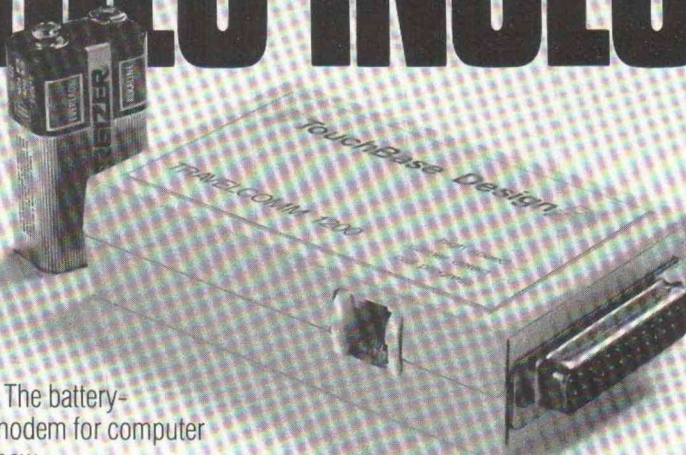
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Whether you're a businessperson, journalist, police officer or student, you can't afford idle time. Our affordable Model 100, Tandy 200, and Tandy 600 portable computers are invaluable tools that help keep you on top of your work wherever you go.

Computing power for less

The popular Model 100 (26-3802) is perfect for writing letters, reports and other correspondence anywhere, at any time. Or use the 100 as your personal appointment calendar and name/address and phone directory. This lightweight computer was the first to feature five instant-on programs, as well as a 40 × 8 display—all built in.



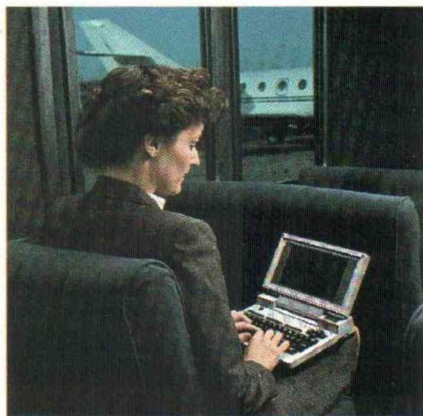
At only \$499, this powerful little traveler offers you more options than you thought possible—including a built-in modem and a communications program that lets you access other computers or national information services by phone. You can even write your own programs in BASIC.

Powerful portability

The \$799 Tandy 200 represents a true second generation in portable computers. Not only does it come with its own built-

in software, improved features, a bigger 40 × 16 flip-top screen, and a larger memory, but it weighs only 4½ pounds.

Plus, the Tandy 200 (26-3860) comes with powerful Multiplan® spreadsheet analysis built right into the memory. You can do complex spreadsheet calculations at the touch of a key. Answer thousands of "what if . . . ?" questions instantly.



Our most advanced laptop

The high-performance Tandy 600 (26-3901) features a 16-bit microprocessor, an 80 × 16 display, a built-in 3½" disk drive that stores 360K of data, and 32K RAM (expandable to 224K).

At \$1599, the Tandy 600 also includes five resident applications—all designed by Microsoft for anyone who's always on the go. With the Tandy 600's larger display and expanded memory, Multiplan can handle more information.

Using MS-Word®, you'll also have quicker access to documents and more storage capacity with the built-in disk drive. File is an electronic database for names and addresses, expenses, client billing and more. With the

Telecom program and the Tandy 600's built-in modem, you can keep in touch over phone lines.



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command. Just hit Escape, type J, then using the Space bar or Tab key, select the "percentage" subcommand, hit Enter, type a number such as 75, hit Enter again and the cursor will move to exactly the three-quarter mark in your text.

With the Merge command, it's also possible to insert entire contents of a separate file in random access memory (RAM) directly into the text on which you are currently working. Hit Escape, type M and at the prompt type the name of the file you want to insert. Hit Enter, and it will appear immediately in front of the cursor. (This command should not be confused with WordStar's Mailmerge; files from the Tandy 600's Word and File can be integrated to some extent, but a letter written on Word cannot be sent automatically to a mailing list in File. Too bad!)

A PLACE FOR EVERYTHING

The most complicated command is Format. Invoke it and you're confronted with a confusing array of choices: Paragraph, Tabs, Document, Repaginate. The Paragraph option is highlighted in reverse, indicating what Word calls its "proposed response." Choose it by pressing Enter, and you get another menu that's even more bewildering.

You move through the menu by pressing Tab. For example, the first line is for alignment. It allows you to choose a flush left, centered, flush right or justified paragraph format.

The highlighted response is left, which is the format I use almost all the time. Some people prefer fully justified text, but without an automatic hyphenation capability I think the variable spacing between words inevitably results in making reading unnecessarily difficult.

On the other hand, although centering every line of a paragraph may strike anyone who is not an avant-garde poet as ridiculous, the command that creates such an oddball shape turns out to be invaluable. Just bear in mind that Word allows each and every paragraph in a document to be given its own format. Want a centered title? Just consider said title to be a paragraph, and format it accordingly. You can do the same with subheads in the body of a text or even asterisks used as centered section dividers.

If you choose, you can format your entire document so that no paragraph will be broken by a page jump, or you

can select only certain paragraphs for such exotic treatment. One trick you have no choice about is Word's scrupulous elimination of widows (single

Word allows each and every paragraph in a document to be given its own format.

words at the bottom of a page) and orphans (single words at the top of a page). Paragraphs will be automatically recalculated to avoid such editorially unacceptable practices. Personally, I'd rather make such decisions myself.

The other paragraph formatting options involve filling in menu blanks with numbers to set the left margin, right indent, paragraph indent and spacing between lines and paragraphs.

Even if you plan to print your document double spaced, without paragraph indents, with generous margins and with extra lines between paragraphs, I suggest you write using a single-spaced format with a two-line paragraph indent, zero left and right margins and no extra paragraph spacing. Given the limited display space of the Tandy 600's screen (13 lines of text, when you subtract the three status lines at the bottom), the writer's first objective is to be able to see as many words as physically possible. When it comes time to print, that's when you should reformat.

Incidentally, the paragraph indent instruction can be either a positive or negative number. Using the minus sign to indicate the latter will provide what some other word processing programs call "undent" — a leading first line with the remainder of the lines in the paragraph indented. Very handy for outlines, resumes, footnotes and the like.

The second Format category is Tabs. Invoke it, and a ruler appears. Use the left and right arrow keys to move the cursor along the line. Wherever you want to set a new tab, press F-2. Using delete (Shift-Backspace) eliminates existing tab stops (preset tab stops occur at five-character intervals; these can-

not be deleted).

The Document menu allows you to format pages and set the parameters of an entire document. For the usual 8 1/2 x 11 inch page, Word's proposed responses may be precisely what you need. Page width has been preset at 85 characters, page length at 66 lines, top margin at six lines (one inch), bottom margin at six lines, left margin at 13 characters and right margin at 12. For the same reasons of maximizing screen display, I suggest resetting the right margin to zero while you write, then reformatting when you are ready to print.

The Document values should be self-evident. If, for example, you plan to be printing out on a 3-inch high envelope instead of a full-size page, simply reset page length to 18 lines (assuming six lines per inch).

Document asks two additional questions: whether you want to number your pages (numerals will always appear at the top right; my preference would have been bottom center); and on what page you want numbering to start — especially handy if you are writing a long manuscript consisting of several files to be run together and numbered consecutively.

Repaginate, the final formatting command, allows you to insert page breaks throughout a document so you can preview how the breaks will fall.

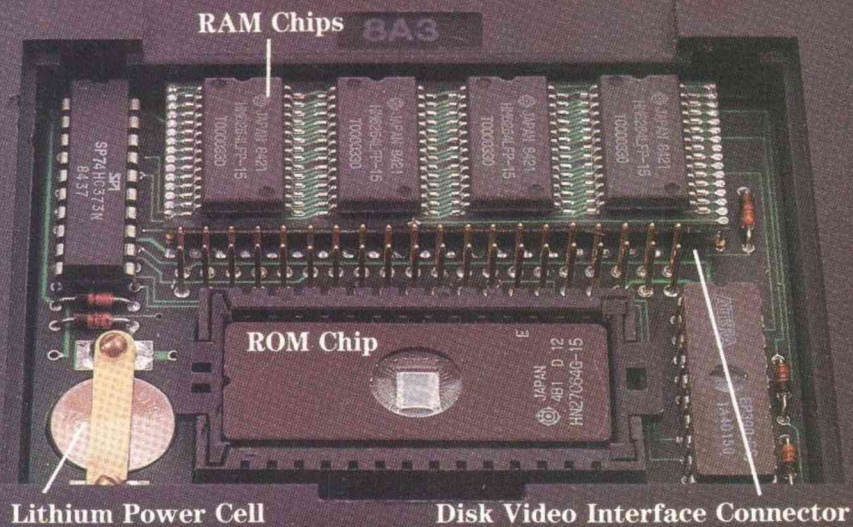
Which brings us to the Print command — a separate function, incidentally, from the Print key which works only with Radio Shack DMP printers to print the contents of the screen and any of the Tandy 600's special graphics characters. Print requires that the System Manager be properly programmed.

To do this you must exit your Word file and return to the main menu. Type S for Set, then use Tab to move to the Printer option. Hit Enter and you'll be presented with a menu that resembles the Format Document menu. After choosing between continuous (tractor) and sheet feed, you fill in the remaining blanks with numbers for page width, page length, top, bottom, left and right margins. The values remain in force for every page you print from then on — until you choose to change them to match a different printer, a new page size or layout.

When you finish, hit Enter, select the Word file you were in, and hit Enter again to return to the cursor location you were at when you quit. Now plug in the printer, connect it to the Tandy

Text continues on page 57

State of The Art RAM Technology

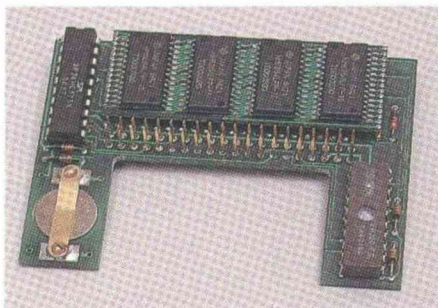


At last, a 96K Model 100!

"The new PG Design RAM should be in every Model 100 built!"

Miniaturized Technology

Our miniaturized RAM chips are state of the art. They are the most advanced memory chips found anywhere in the world. Their tiny size allows us to keep a low profile in the expansion port of the Model 100. We use a technique called *vapor phase soldering* to ensure that each and every tiny connection is clean — perfect.



The RAM module is precision constructed.

Like The Original

Each 32K RAM bank has its own command of the software that comes in your Model 100. BASIC, TEXT, TEL-COM, ADDRSS, SCHEDL are all there in each bank and you can use them as you would in the original bank. Each bank can be accessed from any of the other banks. We even have an optional data transfer program

which allows data to be transferred from one bank to any other bank. It's flawless!

Simple Installation

"Adding this 64K RAM module to your Model 100 is as easy as putting in new batteries." Once you've removed the expansion cover on the back of your Model 100, just snap the PG Design RAM module in. You can't get it wrong! The pins line up perfectly with the expansion holes in the Model 100 compartment. Snap the cover back on and turn your Model 100 over. Turn it on and enter BASIC. Type in the one line program we supply you and presto—you've got a Model 100 with 96K of RAM. You do not need a 32K Model 100 to utilize the PG Design 64K RAM module.

No Need To Remove It

The beauty of this RAM module is that we've enabled you to have a Model 100 with 96K of RAM and we've given you access to the other Model 100 options within the expansion compartment. The DVI connection can be made easily with our rugged connectors. Gone are the flat flimsy pins. And best of all, the ROM slot is clear to insert any ROM modules, (like Tandy's Multiplan on ROM). We designed this RAM module so it wouldn't ever have to be removed from your Model 100. But, if you should remove it, we've installed a lithium

power cell that will keep all the data on the module intact for six months outside the Model 100. Six months! The actual life span of the lithium power cell while in the Model 100 is nearly six years!

Guarantee

We stand behind all the products we manufacture at PG Design. If you are not completely satisfied with your purchase, call us! If we cannot solve your problem, return the product to us and we will refund your money. We are positive that you will be completely satisfied with all our products.

Order Today

64K RAM module — \$375

32K RAM module — \$250

If you want only a 32K version of the RAM module, you may upgrade later for only \$150. The 32K version is constructed exactly as the 64K module.

Data Transfer Program — call

Call us at 313/727-2744, or write. We accept Visa and MasterCard, as well as check or money orders. We ship within five days of receiving your order.

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Circle 39 on Reader Service Card

A Buyer's Guide to Carrying Cases

Portable protection comes in a variety of shapes and sizes. Here's a look at some of the choices.

Compucase

Size: 14 by 10.25 by 2 inches.

Design: This soft-sided case has two compartments. The main compartment holds the computer, and has several pockets on the inside of the cover to store cables, instruction manuals or paper. The second compartment is on the outside of the case, measures 13 by 7 by 2 inches, and is designed to hold computer accessories such as a AC adapter, small disk drive or a cassette recorder. Each compartment is zippered.

Material: Vinyl.

Color: Brown.

Price: \$25 plus \$3 handling and shipping.

Computers: Model 100/200, NEC 8201, Olivetti M 10 and Epson EP 20.

Special features: Carrying handle which can be lengthened into a shoulder strap.

Comments: Not what you would call stylish but an excellent value at under \$30.

Contact: Compucase, Box 3086, Montrose, MI 48457, (313) 639-6182.

Circle No. 108



Chip-tote by Kangaroo Products

Size: 17 by 10 by 4 inches.

Design: Soft-sided case has several compartments. Inside zippered pocket large enough to hold 8.5 by 11 inch paper. Also three 4.75 by 5.25 inch pockets to hold maps, notebooks, pens etc. Main compartment has removable auxilliary zippered pocket, attached by Velcro strips. This is large enough to hold acoustic couplers, modem cable or an AC adapter.

Material: DuPont Cordura fiber on the outside. Inside is a soft poly-cotton fabric covering cross-linked closed cell ethelene foam.

Color: Gray or black.

Price: \$59.95 plus \$2.50 for postage and handling.

Computers: Model 100, 200 "and comparable size briefcase portables."

Special features: Adjustable shoulder strap and one hand carrying strap. Also, adjustable Velcro tabs on the lid keep it from falling off when opened.

Comments: Very durable product. Design derived from suggestions from portable users - particularly journalists.

Contact: Kangaroo Video Products Inc., 10845 Wheatlands Ave., Suite C, Santee, CA 92071-2856, (619) 562-9696.

Circle No. 101



Softpac by Lone Peak Designs

Size: Twelve by 9.25 by 2.25 inches. The Combo/Pac (made to carry printer, modem and other bulky items) comes in two sizes 11.5 by 8.5 by 5.5 inches, or 14 by 12 by 5.5 inches.

Design: Separate pockets for cables and cords as well as areas for chargers, modems, disks, paper, etc.

Material: DuPont Cordura nylon with padded foam, polyester thread, self-repairing coil zipper. Buckles, snap-hooks, tri-rings made of 100 percent Delrin for strength.

Color: Jet black or charcoal gray

Price: \$59.95

Computers: Model 100 and comparable size portable computers.

Special features: Custom tailored. Lifetime guarantee.

Comments: Good looking and well made. Company also makes cases for just printers.

Contact: Lone Peak Designs, Softpac Division, 2500 Haven Lane, Salt Lake City, UT 84117, (801) 272-4668.

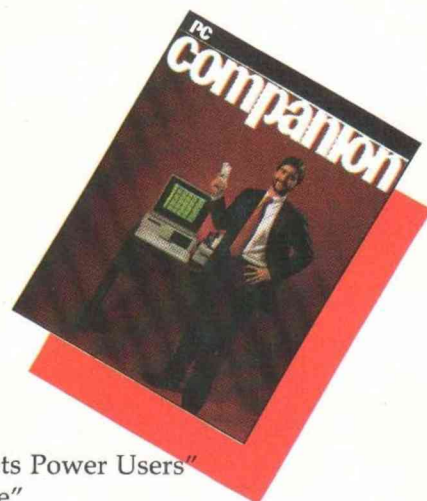
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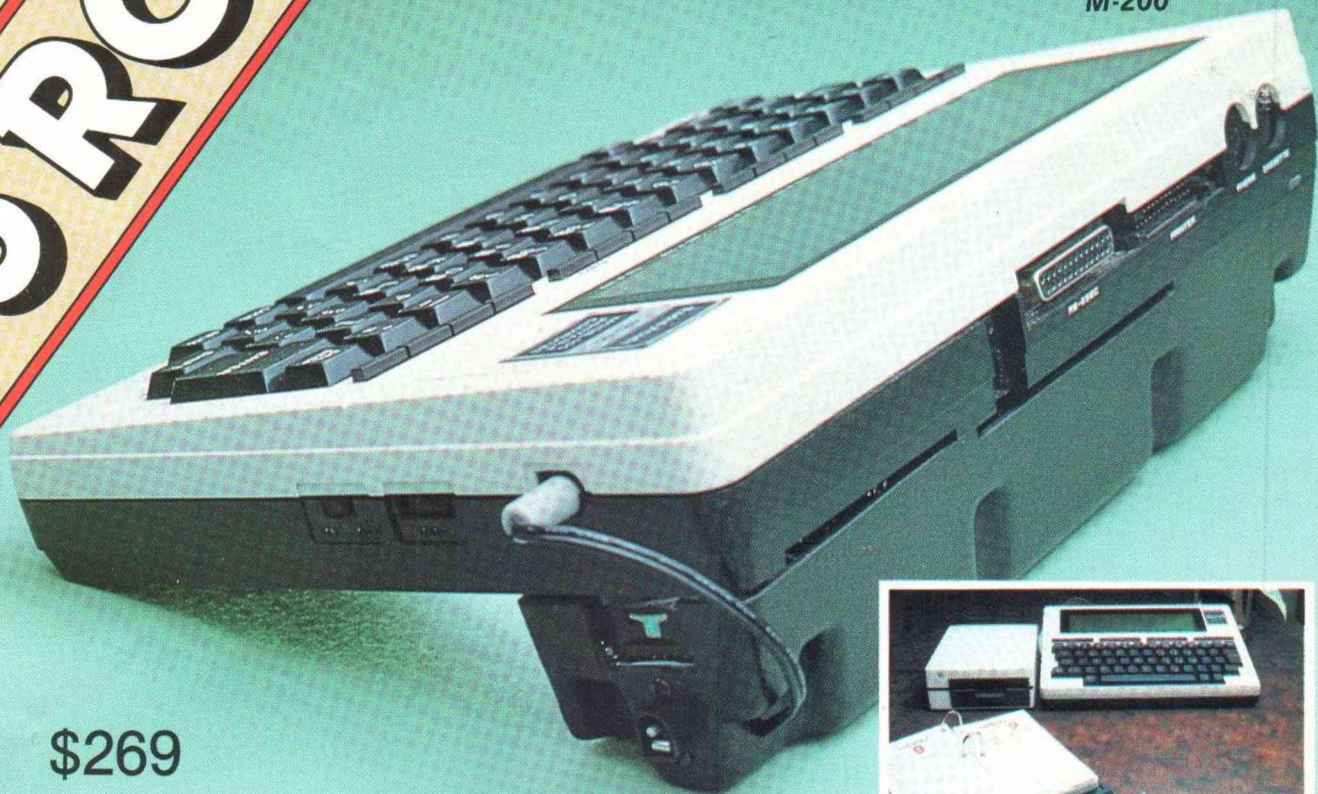
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6 ROM

BANK

plus powerful Nicad battery pack that gives 30 hours of power to your Model 100

NOW
AVAILABLE
ON
M-200



\$269

A joint PCSG/CRYPTRONICS project.



Now you can access LUCID, DISK +, WRITE ROM, RAM+ and others instantly.

The 6 ROM BANK plus battery pack lets you have the ultimate Model 100 system. When you get your unit just press in up to 6 ROMS into the sockets then push in a simple plug into your Model 100's ROM socket. The ROM bank has two posts on either end that insert into the two little holes on the underside of your Model 100.

The ROM bank props up the Model 100 at the same angle and height as those little legs you've seen. The ROM BANK itself is only about 1½" deep and it runs the width of your Model 100. It only weighs one pound. It not only installs instantly, but it pops free in a second if you need everything to lie flat in a briefcase.

Change from ROM to ROM with the touch of a thumb switch.

You can go from LUCID to WRITE to DISK+ to any other ROMS just by turning the thumb switch at the side of the ROM bank. The 6 ROM BANK is a sturdy well built construction that looks like it is a part of your Model 100.

What is also fantastic is that the ROM bank has a powerful NICAD battery and recharger built right in. This power source supplies up to 30 hours of life to your Model 100 with just 6 hours of recharge. What's nice is that it recharges right from your Model 100's power adapter. This is a quick charge system and if you need power in a hurry, you can get 6 hours of life for your Model 100 by just charging for an hour and half.

Suddenly, the Model 100 is a very powerful computer.

If you have the HOLMES portable disk drive with its powerful bundled database software package or the CRYPTRONICS 128K RAM expansion along with LUCID, WRITE ROM and DISK+ in the 6 ROM bank with its rapid rechargeable NICAD power source, you have the ultimate portable system. It's all available only from PCSG.

As usual we don't want you to take our word for it. The 6 ROM BANK is sold on a 30 day trial. If you are not satisfied simply return within thirty days for a full refund. MC, VISA, AM. EX. or C.O.D.

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Circle 32 on Reader Service Card

LP 100 Carrying Case by Communications Systems

Size: 19.25 by 11.5 by 5.25 inches.

Design: Soft-sided case, but has a thick cardboard backing to give it sturdiness. This is padded with $\frac{3}{8}$ inch foam. Inside are pockets to hold different size papers (up to 19 by 11 inches), pens and other small items. Fabric-covered cardboard divider to keep these items away from the computer surface. Main compartment has five removeable partitions. Plenty of room for a modem, tape recorder or other equipment.

Material: DuPont Cordura on the outside. Brushed tricott fabric inside.

Color: Navy blue, gray or burgundy. Inside is light gray.

Price: \$89.95 plus \$2.50 shipping and handling. (\$3.50 for Alaska and

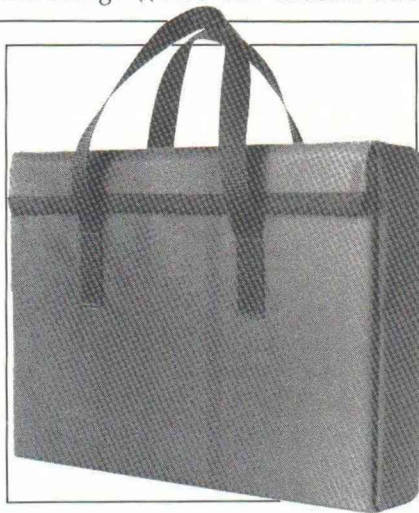
Hawaii.)

Special features: Moveable Velcro partitions; padded handle attaches to itself with Velcro to hold the two sides of the handles together for easy carrying. Shoulder strap. Comes with two padded, zippered cases that would fit different size camera lenses; or perhaps adapters, cords or other small items.

Comments: This case is larger than most and is well suited for journalists or others who might want to carry equipment (i.e. cameras) other than just a portable computer.

Contact: Communication Systems, 1430 E. Calvert, P.O. Box 1874, South Bend, IN 46634, (219) 289-6709.

Circle No. 103



Simons Products Carrying Case

Size: Can easily fit inside a briefcase

Design: This is a hard case to protect your portable from knocks and bumps. It is a simple case that fits snugly around the computer, with no extra pockets or compartments. It can double as a laptop typing easel by simply folding back the cover on itself. The computer is attached to the case by mating Velcro tabs. All ports, switches, battery and ROM covers are accessible without removing the computer.

Material: Backpack-type waterproof nylon.

Color: Navy blue

Price: \$34.95 plus \$5 shipping and handling cost.

Computers: Model 100. Case for Tandy 200 under development.

Special features: Adjustable shoulder strap.

Comments: Simple no-frills design. Ideal for the person who carries nothing more than the Model 100.

Contact: Simons Products, 10908 Glen Wilding Lane, Bloomington, MN 55431, (612) 881-2936.

Circle No. 107

Portable Cases by Omni Enterprises

Size: 13 by 11 by 7 inches (will fit under airline seat)

Design: This case has a simple, uncluttered design, devoid of the usual exterior pockets and traditional zippers. "Its unique structure provides interior pockets on all four sides via the space between the outer body shell and a padded insert, held in place by mating Velcro bands," says Mel Salvat, president of Omni. Meant to be strictly a transporting case, not something one would work out of.

Materials: DuPont Cordura nylon

Color: Black

Price: \$68.00 plus shipping and handling.

Computers: Designed for the Model 100/200, but fits some 13 other similar

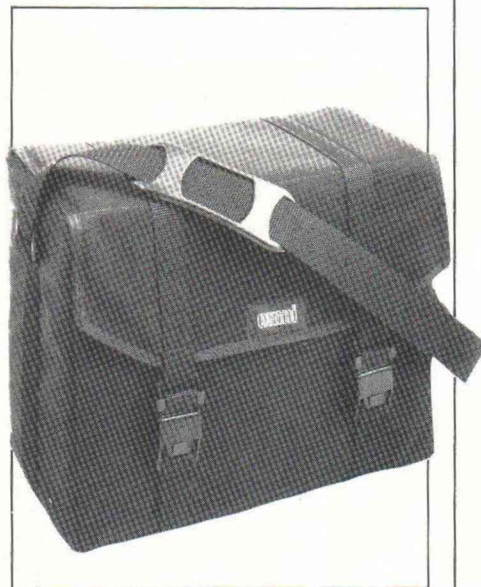
size portable computers.

Special features: A false bottom compartment for storing miscellaneous accessories, repositionable padded compartment partitions, an adjustable shoulder strap that doubles as a carrying handle when set to its shortest length, antistatic treated foam padding throughout and bottom protector studs.

Comments: Simple but practical design. Loads from the top rather than like a suitcase. Good organizer. Holds a lot of equipment in a relatively small space.

Contact: Omni Enterprises, Suite 29, 8200 W. Manchester Ave., Playa Del Ray, CA 90291, (213) 822-8095.

Circle No. 106



Cabbage Cases

Size: Cabbage Cases custom makes cases for computers or other sensitive equipment. A full range of sizes is possible.

Design: Two general kinds of cases are made: the Heavy-Duty case and the Lite-Flite case. Both are intended as flight or shipping cases.

Materials: The Lite-Flite is like a suitcase with a steel frame and reinforced corners. The sides are made of 1/8 inch ABS industrial strength plastic. "You

could probably stand on it, but I wouldn't recommend jumping up and down on it," says Tom Chupka, marketing representative. The HeavyDuty case is made in a similar fashion, but is reinforced with 1/4 inch plywood.

Price: Varies according to specifications. Call Cabbage Cases for estimate.

Computers: All.

Special features: Each case is hand-made, has its own serial number, and comes with a heavy-duty or regular

lock. Wheels and a handle can be added for heavy cases.

Comments: Company makes shipping and freight cases for many items; computers are just one facet of its business. Claim that if you have something the size of a thimble, they'll make a case for it.

Contact: Cabbage Cases, 2458 Wood Avenue, Columbus, OH 43221, (614) 486-2495.

Circle No. 109

Flight Form Cases

Size: Custom built to specifications.

Design: The Flight Form is a reusable shipping case. The Light Flight is a slimmed down version, meant to be used as a carrying case.

Materials: Flight Form uses ABS plastic bonded to plywood. Rivetless extruded aluminum tracking hold the panels together. Inside is high-density

polyester foam.

Color: Red, silver, navy, black, orange, white or grayish-blue.

Price: Depends on size; range is approximately \$200-400. Flight Form cases are about 20 percent more expensive than the Light Flight cases.

Computers: All.

Special Features: Comes with steel

cam lock as standard equipment.

Comments: These are rugged cases that will offer protection whether you are shipping your computer or carrying it with you.

Contact: Flight Form Cases Inc., 13102 Stone Avenue N., P.O. Box 33820, Seattle, WA 98133, (206) 365-5210.

Circle No. 110

Z-Bag by The Athletic Bag Company

Size: 16 by 13 by 3 inches

Design: This soft-sided case holds your briefcase-size portable and has an accessory pocket. Also make shipping and transport cases. Custom made cases are also available.

Materials: DuPont Cordura nylon, with 1.5 ounces of waterproof coating on the outside. The liner is made from urethane-coated Oxford nylon, which is a non-abrasive material. It's padded with

one-half inch of non-deteriorating, non-memory foam that will not rot, mold, mildew or dry out.

Color: Maroon, blue, black and gray.

Price: \$82

Computers: Accommodates Tandy portables, Apple IIc, Sharp PC 5000 and Hewlett Packard HP-110. Can also be custom made to fit other computers.

Special features: Dual heavy-duty zippers, 1.5 inch web handles, lifetime

warranty against defects in materials and workmanship, silk screened logo (free) or embroidery of your logo, name or address.

Comments: Company has custom-designed bags for just about any computer. Good looking and well made.

Contact: Z-Bag/Athletic Bag Co., 2020 Industrial Circle, P.O. Box 27273, Salt Lake City, UT 84127, (801) 972-4866.

Circle No. 105

American Tourister Carrying Cases

Size: American Tourister makes custom cases to fit individual computers and the standard equipment that comes with them. Sizes vary.

Design: Both soft and hard sided cases are available.

Material: Soft-sided cases are made from DuPont Cordura fabric lined with foam. Shoulder straps are available. Hard-sided cases are made from ther-

maformed ABS plastic, with stainless steel frame, and padded handle. Various foams are used on the inside, depending on dealer specifications for the computer.

Color: Varies according to specifications.

Price: Varies according to specifications. Call for estimates.

Computers: All Tandy portables as

well as NEC 8201 and Olivetti M10.

Special features: Padded, adjustable shoulder strap.

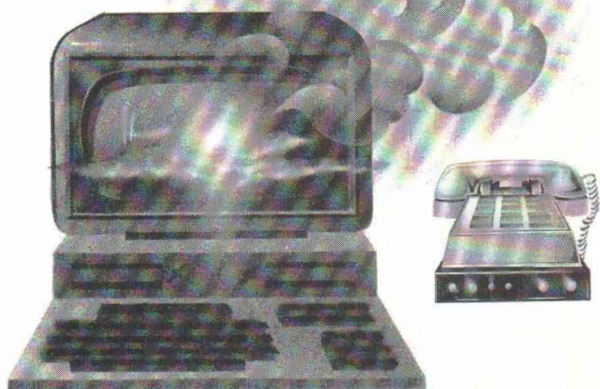
Comments: American Tourister prides itself on customizing cases to fit a particular computer. Good quality, durable — higher end of price scale.

Contact: American Tourister, 91 Main Street, Warren, RI 02885, (401) 245-2100.

Circle No. 104 — By Eva P. Thompson

If you compute after dark...

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	SIGs/User Groups	Electronic Mail	CB Simulator	Computing News	Games	2400 baud access	Registration fee	Monthly minimum	Non-prime time rates	
									300 baud	1200 baud
GENie*	X	X	X	X	X	X	\$18.00	none	\$5.00	\$5.00
CompuServe	X	X	X	X	X	X	\$39.95	none	\$6.25	\$12.75
The Source	X	X	no	X	X	X	\$49.95	\$10.00	\$8.40	\$10.80

*Rates and Services shown in effect 12/85. Non-prime time rate applies Mon–Fri, 6pm–8am local time, all day Sat., Sun., and nat'l. holidays. Subject to service availability. Additional surcharge applies for 2400 baud service.

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With your personal computer, modem, communications software, and telephone, you already have everything you need to make GENie come to life. You'll receive **FREE OF CHARGE**—3 hours of non-prime time use—a \$15.00 value.

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3. Dial 1-800-638-8369. When connected, enter HHH
4. At the U# = prompt, enter SJM11992, GENIE then RETURN.

No Modem Yet? Need more information or assistance? We can help! Call 1-800-638-9636, ext. 21.

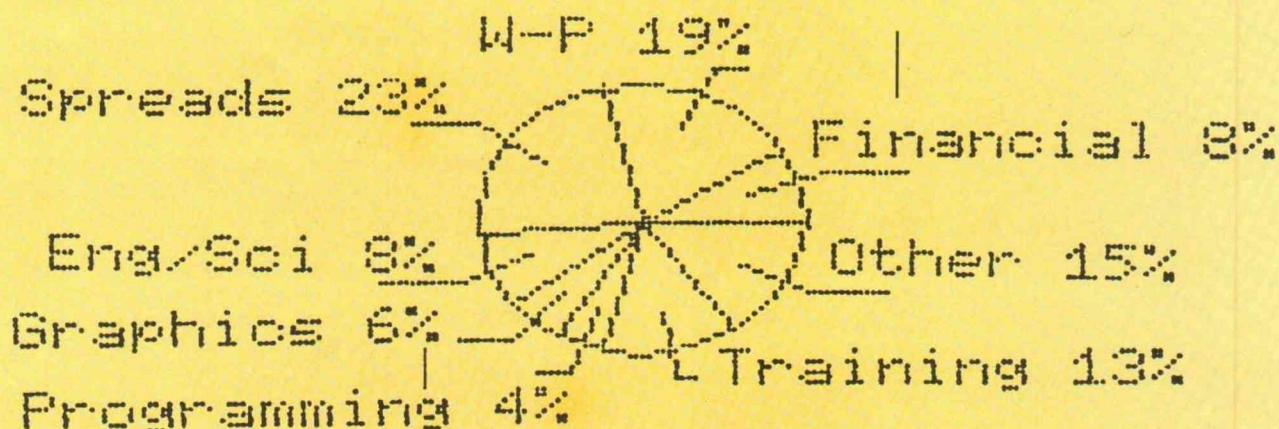
Get on-line with GENie. And stay longer, for less.



INFORMATION SERVICES

Anyone For Pie?

By Alan L. Zeichick



"Mommy, Susie's piece of the pie is bigger than mine! That's not fair!"

Heard that recently? Those words aren't spoken only at the dinner table — but also at the conference table, especially during budget season.

The pie chart, which uses our human ability to judge the relative sizes of plane or solid objects, is an efficient way of displaying breakdowns of numbers, whether it's the percentage of a company's budget that goes to each department, or the distribution of your paycheck between fixed and variable expenses.

In the hands of a graphic artist, a pie chart can be beautiful — but the emphasis should be on the data displayed. Since the chart is designed and created through mathematics, is it any surprise that business-graphics software usually includes a "pie" option?

THE INGREDIENTS

Pie charts, unlike bar and line charts, show the components of a static figure. You can't use a pie to demonstrate annual sales increases or the effects of

inflation. Each pie segment represents a percentage of a total, and the raw data to a pie-chart program needs to be the individual components of a static quantity. In PIE.BA, the data can be actual percentages or real-world numbers.

How about running through the pie-chart creation process? Let's graph the following data which represents the microcomputer applications in state and local governments:

Application	Data
Financial	8.7
Word Processing	19.6
Spreadsheets	23.5
Engineering	8.7
Graphics	6.5
Programming	4.4
Training	13.4
Other	15.2

Before we can determine the size of each slice of pie, the data needs to be converted to a series of percentages. In our example, the data actually represents percentages, so we can skip that

step. PIE.BA always converts the data to percentages automatically. But it's not really the percentages we want; it's *cumulative percentages*:

Application	Cum. Percent
Financial	8.7
Word Processing	28.3
Spreadsheets	51.8
Engineering	60.5
Graphics	67.0
Programming	71.4
Training	84.8
Other	100.0

SETTING THE TEMPERATURE

A two-dimensional pie chart represents a circle. Since the combined "slices" of the pie chart make 360-degree circle, it seems obvious that our percentages above can be translated directly to degrees of arc.

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YOU BE THE EDITOR

Every reader has unique needs. Some seek guidance from reviews of software and peripherals. Others look to a magazine to provide tips to increase their programming proficiency. Accounts of innovative applications attract a big audience, as do articles about other users who find creative ways to use their systems.

You can help tailor **Portable 100/200/600** to your unique needs by rating the articles that appeared in this issue. Just circle the numbers indicated below on the Reader Service Card at left. Rate all the articles, some of them or just one. Then detach the card and drop it into the mail — we pay the postage.

The editors will analyze your feedback and respond by commissioning more articles of the most popular types — and fewer of the losers.

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Graphically Speaking

Create bar graphs on your portable with a minimum of effort

By John and Aileen Cornman

With its 15,360 individual pixels the Model 100's LCD screen can display graphs in enough detail to convey data trends and relationships. Using Graph100 you quickly create meaningful bar graphs after simply placing the data to be graphed in a random access memory (RAM) file with the built-in TEXT program.

Graph100 lets you select whether the bars should be drawn in either horizontal or vertical format. Single items of data may be graphed to visualize trends, or pairs of data items may be graphed side by side to highlight comparative relationships. On comparative graphs, one bar of a pair will appear solid while the other is an outline. Legends indicating the meaning of each kind of bar are created automatically. You also have the option of displaying the graph with a "truncated" scale in order to accentuate the differences in the lengths of the bars.

In addition to displaying the graph on the screen, Graph100 also lets you produce a hardcopy version on a CGP-115, LP VII or FX-80 printer.

USING GRAPH100

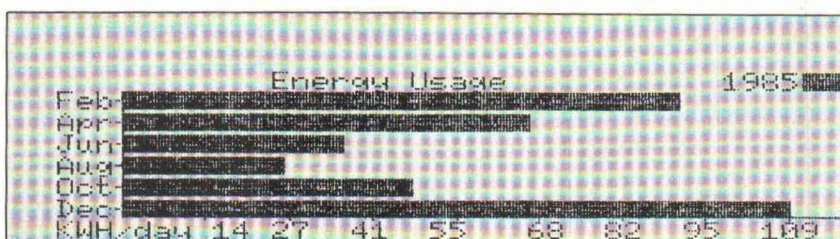
Before running Graph100, you must create a data file using TEXT. You may name the file anything you please.

For single item graphs (see example), the first line of the data file is the title line containing three items separated by commas. The first item on this line must be the units the graph will display. In this case "kilowatt hours per day" was abbreviated "KWH/day." Given the limited display space on the screen, it's a good idea to keep your unit descriptions as short as possible.

The second item is a short title of the graph, "Energy Usage."

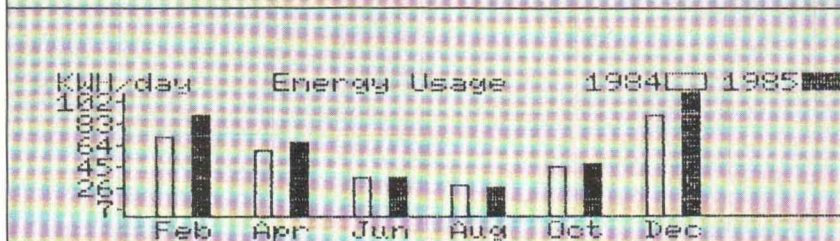
The final item is the legend that will appear on the graph. Since all the data in this single line item graph are for 1985, only one legend label is specified.

The second through seventh lines are for data. Each contains a label for one bar and the data to be represented by that bar. These two items must be separated by a comma. Each label on every line must be the same length.



KWH/day,Energy Usage,1985

Feb,91
Apr,66
Jun,36
Aug,26
Oct,47
Dec,109



KWH/day,Energy Usage,1984,1985

Feb,71,91
Apr,59,66
Jun,35,36
Aug,29,26
Oct,46,47
Dec,91,109

The above graphs show how home energy use can be displayed using Graph100. The graph at the top is an example of a horizontal item graph. The data file used to create it is below. The graph at the bottom shows a vertical comparative graph and its data file.

If you intend to display the graph in horizontal format, you can't have more than six data lines in the file. For vertical graphs, however, the limit is determined by how many characters you use for labels. As an extreme case, one-

letter labels would allow you to graph 37 different items vertically if the units were restricted to a single digit.

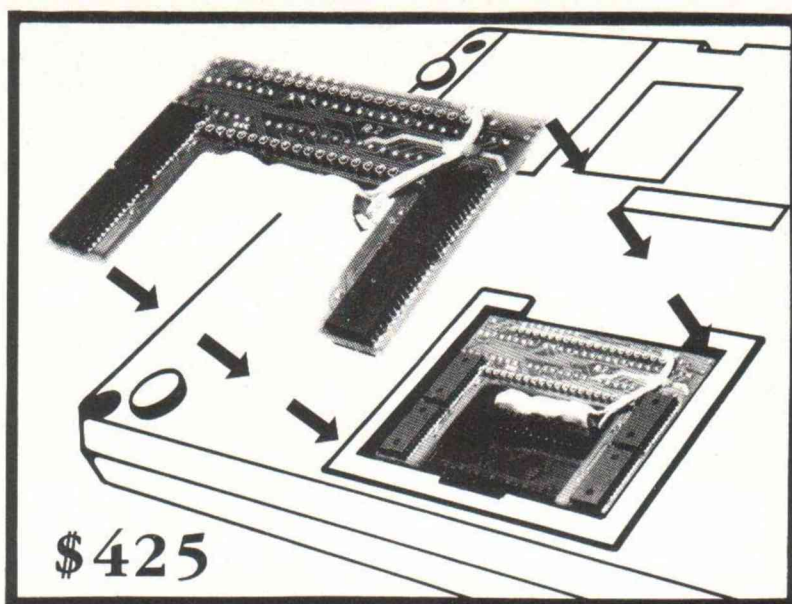
The data file for a comparative graph differs from the single item data file in only two respects: There are two leg-

Give your Model 100

128K

RAM

Installs as easily
as plugging
in a socket



Software included, transfers from bank to bank. Works like main menu! Includes powerful RAM Basic that lets any program regard the 128K as one continuous bank.

PCSG says: Satisfaction guaranteed or your money back within 30 days

As amazing as it seems you can upgrade your Model 100 to 128K of RAM in just 60 seconds.

It comes to you right out of the box looking just like the picture. You just open the little compartment on the back of your Model 100 with a quarter and it just pushes right into place. You can then put the cover back in its place.

You then have 4 banks of RAM of 32K each. The additional three banks also work just like your Main Menu.

You push a function key and you are in the second bank. Push again and you are in third, again, then fourth. Press it once again for your original bank.

It has its own built-in NiCad battery that recharges right from the Model 100 and its guaranteed for a full year.

What is really great is that you can copy a file from one bank to another with just a function key.

Each bank is like having another Model 100, and all the built-in programs as well as any snap-in ROM programs appear in all four banks and work the same way. Your widebar cursor moves from file to file and you access any file or run any program just by pressing ENTER.

What lets you copy any file from one bank to another is a snap-in ROM from PCSG called RAM+, that comes at no extra charge. It just pushes right into the little socket in that same compartment with the 96K expansion unit.

Not only does this firmware let you copy a file from bank to bank, but you can make a copy of any file within the same bank instantly with a function key. Great for Lucid spreadsheets!

Copy a file from bank to bank with a function key

You can also rename a file, or kill any file with just a function key. Plus you can do a whole lot of other useful things like setting the date, day and time with function key ease. You even have a function key that lets you use non-Radio Shack printers without having to make those tricky dipswitch settings.

RAM+ lets you cold start any one of your banks without affecting the other three. That means that anytime you want you can clean out a bank's entire memory, but leave intact all the files in the other banks.

What is also fantastic is that you don't have to have the ROM in place to use the additional RAM. Whenever you take out the snap-in ROM it leaves behind a tiny machine code program that lets you switch from bank to bank just by pressing ENTER.

This lets you use your ROM socket to snap-in other ROMs like LUCID spreadsheet, WRITE ROM text processor, or DISK+ ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM+ ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

And what has made a lot of people happy is that the system bus, located in the same compartment, is left free for you to plug in a DVI or the Holmes Engineering/PCSG portable disk drive.

The ability to copy a file from bank to bank instantly with a function key, plus all of the other features make this RAM extension truly an engineering masterpiece.

Some people hesitate when they think of installing something, and then others are skeptical that any additional hardware could be as good as the Model 100 itself. That's why we sell these 96K expansions on a 30 day trial. Simply return it within 30 days for a full refund if you are not satisfied. Priced at \$425. MC VISA COD.

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BAR GRAPH

end items on the title line, "1984" and "1985"; each data line contains two data items after the label instead of one. The first data item corresponds to the first legend item (1984), while the second data item corresponds to the second legend item (1985). Comparative graphs are limited to displaying two items of data per label.

RUNNING GRAPH100

Once your data files have been created, run the Graph100 program following these steps.

First you'll be asked to enter the name of the data file you want to graph. Type in the file name. Quotation marks or file extensions aren't necessary. Then press Enter.

Graph100 next asks if you want scaling to be full scale or truncated. Type a F to select full or a T for truncated. You won't need to follow your selection with Enter. Full scale means the value at the beginning of the scale line should be zero (the normal way to present bar graphs). Truncated means that the program will select a value for the beginning point of the scale line that's just below the lowest value present in the data. If all of the data items are relatively close together, the truncate option makes it easier to recognize the differences.

Next choose whether you want the graph to be displayed horizontally or vertically by typing an H or V, respectively. Again, there's no need to follow your selection with Enter.

The next menu asks you to select the output device the graph will be sent to.

• Type a 1 to view the graph on the LCD screen only.

• Type a 2 to send the graph to a CGP-115 Color Graphics Printer.

• Type a 3 to print the graph on an Epson FX-80 printer. Most Epson MX models should also work with this option. The program doesn't send a line feed after each carriage return character so you'll have to set your DIP switch accordingly.

• Type a 4 to print the graph on a TRS-80 Line Printer VII, DMP 100 or any other printer that uses the LP VII codes to print graphics with columns of seven dots each.

• Option 5 has been included for output to any other printer or plotter that has special requirements. Line numbers in the 5000 range have been set aside in the program for insertion of device dependent programming.

If you select output option 1, Graph100 immediately displays the

bar graph you requested. Options 2, 3 and 4 prompt you to press Enter when the printer is ready. In every case, the graph appears on the screen first, then on the printer. If any errors are detected in the data file, the program asks you to correct them before rerunning the program.

There are two possible errors that the program will prompt you for: "Too many labels," meaning you attempted to graph more than six data lines in a horizontal format; and "Labels too long" meaning that in the vertical format, the number of labels times the length of each label exceeds the number of available spaces along the bottom of the graph.

If you get an "FF" error from BASIC (meaning the data file name you gave could not be found), just rerun the program and supply the correct name.

To select another data file, press Enter and you'll be returned to the first step. Pressing any other key will return you to the Model 100 main menu. □

*GRAPH100.BA, a program for creating
bar graphs on your Model 100.*

```

1 'Graph100
10 CLEAR 300,62881
:DEFINT A-Z
:CH!=65516
:GR!=62907
:UD!=62882
:DP=5232
:GOSUB 60000
20 CLS
:FIS=""
:PRINT
:LINE INPUT "Enter name of RAM
data file: "; FIS
:IF LEN(FIS)<1 OR LEN(FIS)>6
THEN 20
22 PRINT
:PRINT "(F)ull scale or
(T)runcated?"
24 GOSUB 900
:IF K$="T" OR K$="t" THEN TR=1
ELSE TR=0
26 PRINT
:PRINT "(H)orizontal or
(V)ertical bars?"
28 GOSUB 900
:IF K$="H" OR K$="h" THEN H=1
ELSE H=0
30 CLS
:PRINT
:PRINT "Output to:"
:PRINT "(1) LCD
32 PRINT "(2) CGP-115"
:PRINT "(3) FX-80

```


BAR GRAPH

```

34 PRINT "(4) LP VII"
:PRINT "(5) Other";
36 GOSUB 900
:OF=VAL(K$)
:IF OF<1 OR OF>5 THEN 30
38 CLS
:GOSUB 9000
40 ON OF GOSUB 1000,2000,3000,4000,5000
50 GOSUB 900
:IF K$=CHR$(13) THEN 20 ELSE MENU
900 K$=INKEY$
:IF K$="" THEN 900 ELSE RETURN
1000 CLS
:GOSUB 8000
1010 IF H=0 THEN GOSUB 7000 ELSE GOSUB 6000
1020 RETURN
2000 PRINT
:INPUT "Color of axes and labels (0-3)";C0
:IF C0<0 OR C0>3 THEN 2010
2010 PRINT
:INPUT "Color of bar #1 (0-3)";C1
:IF C1<0 OR C1>3 THEN 2010
2020 IF ND=2 THEN PRINT
:INPUT "Color of bar #2 (0-3)";C2
:IF C2<0 OR C2>3 THEN 2020
2030 PRINT
:PRINT "Press ENTER when printer is ready..."
:GOSUB 900
2040 GOSUB 1000
2050 LPRINT CHR$(18); 'SET GRAPHIC MODE
2060 LPRINT "I" 'SET REFERENCE ORIGIN
2062 LPRINT "C";C0 'SET AXIS COLOR
2064 LPRINT "S1" '40 TEXT CHARACTERS PER LINE IN
GRAPHIC MODE (CPL=80/SIZE+1)
2070 X=LM*12+4
:LPRINT "M";X;",";-16" 'MOVE TO TOP OF Y AXIS
2080 LPRINT "D";X;",";-109,479,-109" 'DRAW Y AXIS THEN X AXIS
2090 FOR Y=-22 TO -102 STEP -16
2092 LPRINT "M";X-2;",";Y
:LPRINT "D";X;",";Y 'DRAW 6 Y AXIS SCALE MARKS
2094 NEXT Y
:YA=46
:XC=38-LM
2096 IF H=1 THEN 2112
2098 XN=0
:FOR I=1 TO 6
:N=INT(43/46*HV-(I-1)*8/46*(HV-TV)+.5)
2100 IF N=XN OR N=0 THEN 2104
2102 XN=N
:LPRINT "M0";",";-I*16-15
:LPRINT "P";
:LPRINT USING STRINGS(LM,"#");N 'SCALE MARK Y AXIS
2104 NEXT
2112 OPEN FIS FOR INPUT AS 1
2116 INPUT #1,HDS$,TS$,G1$
:IF ND=2 THEN INPUT #1,G2$
2118 IF H=0 THEN LPRINT "M0",-15" ELSE LPRINT "M0",-127"
2119 LPRINT "P";HDS
2120 IF H=0 THEN X=LEN(HDS$)+(40-LEN(HDS$)-ND*(LEN(G1$)+2)-LEN(T$))\2 ELSE X=(40-ND*(LEN(G1$)+2)-LEN(T$))\2
2121 LPRINT "M";X*12;",";-15"
:LPRINT "P";TS$ 'PRINT TITLE
2122 L2=40-LEN(G1$)-2
:LPRINT "M";L2*12;",";-15"
:IF ND=2 THEN LPRINT "P";G2$ ELSE LPRINT "P";G1$
'PRINT RIGHTMOST LEGEND
2123 LPRINT "C";C1 'CHANGE TO BAR 1 COLOR
2124 X=456
:Y=0

```

Circle 29 on Reader Service Card

GPIB



GPNET model 10

- CPU Z8 Single chip controller (8 MHz)
- ROM 4KB RAM 2KB
- GPIB Controller NEC uPD7210
- RS232C I/O (300-19200bps)
- IEEE-488 bus connector
- GPIB function:
 - SH1 AH1 T6 TE6 L4 LE4
 - SR1 RL2 PPO DC1 DT1
 - C1 C2 C3 C4 C7
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Circle 23 on Reader Service Card

BAR GRAPH

```

:X2=479
:Y2=-13
:GOSUB 2990 'DRAW LEGEND BOX
2125 IF ND=1 THEN 2128
2126 L1=L2-LEN(G1$)-3
:LPRINT "M";L1*12;"",-15"
:LPRINT "C";C0
:LPRINT "P";G1$ 'BAR 2 LEGEND
2127 X=(L1+LEN(G1$))*12
:X2=X+24
:Y=0
:Y2=-13
:LPRINT "C";C2
:GOSUB 2990 'DRAW BAR 2 LEGEND BOX
2128 LPRINT "C";C0
:IF H=1 THEN 2150 ELSE K$=""
:LPRINT "M";(LM+SE)*12;"",-127" 'POSITION FOR
1ST LABEL
2129 LINE INPUT #1,L$
2130 K$=K$+LEFT$(L$,LL)
2132 IF EOF(1) THEN CLOSE
:LPRINT "P";K$
:GOTO 2200 ELSE K$=K$+STRING$(SI," ")
:GOTO 2129
2150 Y=-127+(NL*16)
2152 LINE INPUT #1,L$
2153 LPRINT "M0";Y
2154 LPRINT "P";LEFT$(L$,LL)
:Y=Y-16
2156 IF NOT EOF(1) THEN 2152 ELSE CLOSE
2158 LN=LEN(STR$(HV))
2160 NN=XC\LN
:IF HV<NN THEN NN=HV

```

```

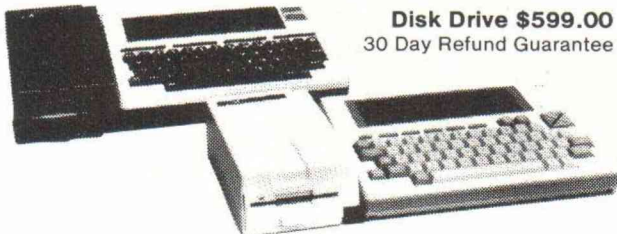
2162 FOR I=1 TO NN
2164 NP=TV+INT(I/NN*(HV-TV)+.5)
:LN=LEN(STR$(NP))-1
2170 X=LM*6+2+INT(I/NN*XA)
2171 LPRINT "M";X*2;"",-110"
:LPRINT "D";X*2;"",-111"
2172 P=280+(X-(LN*3)+3)\6
2174 IF P>280+LEN(HD$) THEN LPRINT
:M";(P-280)*12;"",-127"
:LPRINT "P";
:LPRINT USING STRING$(LN,"#");NP ELSE IF
P=280+LEN(HD$) AND LN<(LEN(STR$(HV))-1) THEN
LPRINT "M";(P-279)*12;"",-127"
:LPRINT "P";
:LPRINT USING STRING$(LN,"#");NP;
2176 NEXT
2200 IF H=0 THEN 2500 'DRAW BARS
2202 OPEN F1$ FOR INPUT AS 1
:AL=XA
:X=LM*12+4
2204 LINE INPUT #1,L$
:Y=(6-NL)*8
2206 FOR I=1 TO NL
2208 INPUT #1,L$,D1
:IF ND=2 THEN INPUT #1,D2
2210 D=D1
:GOSUB 8100
2212 Y=Y+8
2214 X2=X+2*SL
:IF ND=2 THEN 2220
2216 Y2=Y+6
:GOTO 2230
2220 Y2=Y+2

```

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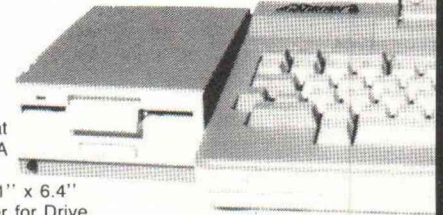
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Circle 31 on Reader Service Card

PORTABLE 100/200/600 JUNE 1986

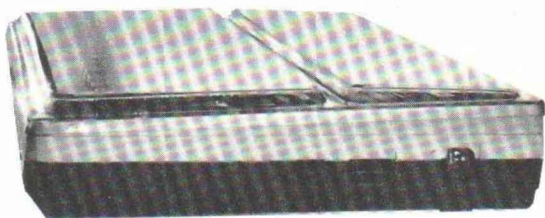
BAR GRAPH

```

2230 YY=Y
      :Y=-Y*2
      :Y2=-Y2*2-1
2231 IF ND=2 THEN LPRINT "C";C2 ELSE LPRINT "C";C1
2232 GOSUB 2990
      :Y=YY
      :IF ND=1 THEN 2300
2234 D=D2
      :GOSUB 8100
2236 Y1=Y+4
      :Y2=Y+6
2238 X2=X+2*SL
2239 YY=Y
      :Y=-Y1*2
      :Y2=-Y2*2-1
2240 LPRINT "C";C1
      :GOSUB 2990
      :Y=YY
2300 NEXT I
      :CLOSE
      :LPRINT "A"
      :RETURN
2500 OPEN FIS FOR INPUT AS I
      :AL=YA
      :Y1=54
2504 LINE INPUT #1,L$
      :X=(LM+SE)*6
2506 FOR I=1 TO NL
2508 INPUT #1,L$,D1
      :IF ND=2 THEN INPUT #1,D2
2510 D=D1
      :GOSUB 8100
      :IF I=1 THEN 2514
2512 X=X+(LL+SI)*6
2514 Y2=Y1-SL
      :IF ND=2 THEN 2520
2516 X2=X+LL*6-2
      :GOTO 2530
2520 X2=X+LL*2-1
2530 XX=X
      :X=X*2
      :Y=-Y2*2
      :X2=X2*2
      :Y2=-Y1*2-1
2531 IF ND=2 THEN LPRINT "C";C2
      :GOSUB 2990 ELSE LPRINT "C";C1
      :GOSUB 2990
2532 X=XX
      :IF ND=1 THEN 2600
2534 D=D2
      :GOSUB 8100
2536 X1=X+LL*4-1
      :X2=X+LL*6-2
2538 Y2=Y1-SL
2539 XX=X
      :X=X1*2
      :Y=-Y2*2
      :X2=X2*2
      :Y2=-Y1*2-1
2540 LPRINT "C";C1
      :GOSUB 2990
      :X=XX
2600 NEXT I
      :CLOSE
      :LPRINT "A"
      :RETURN

```

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WRITE ROM — as its name implies — is on a snap-in ROM. You simply open the little compartment on the back of the Model 100 with a quarter and press WRITE ROM in. It's as easy as an Atari game cartridge. You can use other ROM programs like Lucid whenever you wish.

WRITE ROM lets you do every formatting function you'd expect, like setting margins, centering, right justifying and creating headers and footers. But it does them under function key control.

WRITE ROM remembers your favorite format settings so you can print a document without any setup, but you can change any formatting or printing parameter instantly with a function key.

WRITE ROM's "pixel mapping" feature shows you an instant picture on the screen of how your printout will look on paper.

In all there are 64 separate features and functions you can do with WRITE ROM, and some of these features are truly breakthroughs for the Model 100.

First, WRITE ROM lets you do search and replace. Any word or phrase in a document can be searched for and replaced with any other phrase where the search words appear.

Second, WRITE ROM lets you send any text (formatted or not) to any other computer over the phone with just a function key. What's more, it dials and handles sign-on and sign-off protocol automatically.

Third, WRITE ROM has a wonderful feature called Library that lets you record favorite phrases, words or commonly used expressions (often called boilerplate).

Any place you wish Library text to appear you just type a code. WRITE ROM automatically inserts the text just like a Xerox Memory Writer. Picture what you can do with that kind of capability.

WRITE ROM is blindingly fast. No one can claim faster operation. Because it is on ROM it uses virtually none of your precious RAM. It works with any printer, serial or parallel. You can make a duplicate copy of a document file under a new filename. Rename or delete (kill) any RAM file with function key ease.

This description only scratches the surface of this amazingly powerful piece of software. Dot commands allow control of such things as margins, centering, line spacing and other changes in the middle of a document. Most are WordStar™ compatible.

A mailmerge feature allows you to send the same document to every name on your mailing list, personalized for each recipient.

WRITE ROM enables you to do underlining, boldface and correspondence mode as well as any other font feature like superscripts that your printer supports, in a way that many users say "is worth the price of the program."

To underline you don't have to remember a complicated printer code. You just type CODE u, and to stop underline, CODE u again. The CODE key is to the right of your spacebar. Boldface? CODE b to start and stop. Easy to remember and do. Five different printer features of your choice.

We couldn't list all the features here. For example, you can select not just double space but triple or any other. You can use your TAB

key in a document. WRITE ROM allows you to indent. This means you can have paragraphs with a first line projecting to the left of the rest of the paragraph. WRITE ROM has a feature unique for any word processor on any computer. It's called FORM. FORM is an interactive mechanism that lets you create screen prompts so that you or someone else can answer them to fill out forms or questionnaires.

With FORM, any place that you had previously typed a GRAPH T and a prompt in a document, WRITE ROM will stop and show you that prompt on the screen. You can type in directly on the screen and when you press F8 you see the next prompt. It goes to a printer or a RAM file.

Think how you can use FORM. A doctor or nurse could use it for a patient's history with each question appearing on the screen. An insurance salesman could use it for his entire questionnaire. You could construct a series of prompts to answer correspondence, typing the answers, even using Library codes. This feature lets you answer letters in rapid-fire fashion, each with personalized or standard responses.

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```

2990 LPRINT "M";X;",";Y 'MOVE TO UPPER LEFT CORNER
    OF BOX
2991 LPRINT
    "D";X2;",";Y;",";X2;",";Y2;",";X;",";Y2;",";X;","
    ";Y 'OUTLINE BOX
2992 DX=ABS(X-X2)
    :DY=ABS(Y-Y2)
    :IF DX<2 OR DY<2 THEN RETURN
2993 IF DX<DY THEN 2996
2994 FOR YF=Y-1 TO Y2+1 STEP -2
    :LPRINT "M";X;",";YF
    :LPRINT "D";X2;",";YF
    :IF YF>Y2+1 THEN LPRINT "M";X2;",";YF-1
    :LPRINT "D";X;",";YF-1
2995 NEXT
    :RETURN 'FILL IN BOX LEFT AND RIGHT
2996 FOR XF=X+1 TO X2-1 STEP 2
    :LPRINT "M";XF;",";Y
    :LPRINT "D";XF;",";Y2
    :IF XF<X2-1 THEN LPRINT "M";XF+1;",";Y2
    :LPRINT "D";XF+1;",";Y
2997 NEXT
    :RETURN 'FILL IN BOX UP AND DOWN
3000 GOSUB 4900
    :GOSUB 1000
3010 LPRINT CHR$(27);"1";
    :CALL DP,PM 'SET LEFT MARGIN
3020 LPRINT CHR$(27);"A";CHR$(8); 'SET LINE SPACING
    TO 8/72 INCH
3030 FOR Y=0 TO 56 STEP 8
3035 LPRINT CHR$(27);"K";CHR$(240);CHR$(0); '240
    SINGLE DENSITY GRAPHIC BYTES
3040 FOR X=0 TO 239
3050 CALL GR!,X,Y 'GET DOT COLUMN
3060 CALL UD! 'INVERT DOT COLUMN
3070 CALL DP,PEEK(CH!) 'PRINT IT
3080 NEXT X
    :CALL DP,13 'CR/LF
3090 NEXT Y
    :LPRINT CHR$(27);"2" 'RESTORE 1/6 INCH LINE
    SPACING
3100 RETURN
4000 GOSUB 4900
    :GOSUB 1000
4010 FOR PP=0 TO 9
4020 IF PM<>0 THEN LPRINT CHR$(30);
    :FOR I=1 TO PM
    :LPRINT " ";
    :NEXT
4030 IF PP<8 THEN BH=PP
    :Y=PP*8 ELSE BH=PP-8
    :Y=(PP-1)*8
4040 IF PP=9 THEN BL=0 ELSE BL=7-BH
4050 LPRINT CHR$(18);
    :FOR X=0 TO 239
4060 IF BH=0 THEN LB=0
    :GOTO 4080
4070 CALL GR!,X,Y-8
    :LB=PEEK(CH!)\2^(8-BH)
4080 IF BL=0 THEN HB=0
    :GOTO 4100
4090 CALL GR!,X,Y
    :HB=(PEEK(CH!)*2^(7-BL))MOD256
4100 PB=HB OR LB OR 128
    :LPRINT CHR$(PB);
4110 NEXT X
    :LPRINT
4120 NEXT PP
4130 LPRINT CHR$(30)
4899 RETURN
4900 CLS
    :PRINT

```

```

    :INPUT "Left margin (0 to 39)";PM
4910 IF PM<0 OR PM>39 THEN 4900
4920 PRINT
    :PRINT "Press ENTER when printer is ready..."
    :GOSUB 900
    :RETURN
5000 GOSUB 1000
5999 RETURN
6000 OPEN FI$ FOR INPUT AS 1
    :AL=XA
    :X=LM*6+2
6004 LINE INPUT #1,LS
    :Y=(6-NL)*8
6006 FOR I=1 TO NL
6008 INPUT #1,LS,D1
    :IF ND=2 THEN INPUT #1,D2
6010 D=D1
    :GOSUB 8100
6012 Y=Y+8
6014 X2=X+SL
    :IF ND=2 THEN 6020
6016 Y2=Y+6
    :GOTO 6030
6020 Y2=Y+2
6030 IF ND=2 THEN LINE (X,Y)-(X2,Y2),1,B ELSE LINE
    (X,Y)-(X2,Y2),1,BF
6032 IF ND=1 THEN 6100
6034 D=D2
    :GOSUB 8100
6036 Y1=Y+4
    :Y2=Y+6
6038 X2=X+SL
6040 LINE (X,Y1)-(X2,Y2),1,BF
6100 NEXT I
    :CLOSE
    :RETURN
7000 OPEN FI$ FOR INPUT AS 1
    :AL=YA
    :Y1=54
7004 LINE INPUT #1,LS
    :X=(LM+SE)*6
7006 FOR I=1 TO NL
7008 INPUT #1,LS,D1
    :IF ND=2 THEN INPUT #1,D2
7010 D=D1
    :GOSUB 8100
    :IF I=1 THEN 7014
7012 X=X+(LL+SI)*6
7014 Y2=Y1-SL
    :IF ND=2 THEN 7020
7016 X2=X+LL*6-2
    :GOTO 7030
7020 X2=X+LL*2-1
7030 IF ND=2 THEN LINE (X,Y1)-(X2,Y2),1,B ELSE LINE
    (X,Y1)-(X2,Y2),1,BF
7032 IF ND=1 THEN 7100
7034 D=D2
    :GOSUB 8100
7036 X1=X+LL*4-1
    :X2=X+LL*6-2
7038 Y2=Y1-SL
7040 LINE (X1,Y1)-(X2,Y2),1,BF
7100 NEXT I
    :CLOSE
    :RETURN
8000 X=LM*6+2
    :LINE (X,8)-(X,54)
    :LINE (X,54)-(239,54)
8002 FOR Y=11 TO 51 STEP 8
    :LINE (X-2,Y)-(X,Y)
    :NEXT Y
    :YA=46

```



```

:XC=38-LM
8003 IF H=1 THEN 8012
8004 XN=0
:FOR I=1 TO 6
:N=INT(43/46*HV-(I-1)*8/46*(HV-TV)+.5)
:IF N<>XN AND N<>0 THEN XN=N
:PRINT @I*40,USING STRINGS(LM,"#");N
8005 NEXT
8006 NS=38-LM-LL*NL
:SE=1
:SI=0
8008 IF NS>=(NL-1) THEN SI=1
:NS=NS-NL+1 ELSE 8012
8010 IF NS>=(NL+1) THEN SE=SE+1
:SI=SI+1
:NS=NS-NL-1
:GOTO 8010
8012 OPEN FIS FOR INPUT AS 1
8016 INPUT #1,HD$,T$,G1$
:IF ND=2 THEN INPUT #1,G2$
8018 IF H=0 THEN PRINT @0,HD$; ELSE PRINT @280,HD$;
8020 IF H=0 THEN PRINT
@LEN(HD$)+(40-LEN(HD$)-ND*(LEN(G1$)+2)-LEN(T$))
\2,T$; ELSE PRINT
@40-ND*(LEN(G1$)+2)-LEN(T$)\2,T$;
8022 L2=40-LEN(G1$)-2
:IF ND=2 THEN PRINT @L2,G2$; ELSE PRINT
@L2,G1$;
8023 LINE (228,0)-(239,6),1,BF
8024 IF ND=2 THEN L1=L2-LEN(G1$)-3
:PRINT @L1,G1$;
:X=(L1+LEN(G1$))*6
:LINE (X,0)-(X+12,6),1,B

```

```

8025 IF H=1 THEN 8050 ELSE PRINT
@280,STRINGS(LM+SE," ");
8026 LINE INPUT #1,LS
8028 PRINT LEFT$(LS,LL);
8030 IF EOF(1) THEN CLOSE
:RETURN ELSE PRINT STRINGS(SI," ");
:GOTO 8026
8050 P=280-NL*40
8052 LINE INPUT #1,LS
8054 PRINT @P,LEFT$(LS,LL);
:P=P+40
8056 IF NOT EOF(1) THEN 8052 ELSE CLOSE
8058 LN=LEN(STR$(HV))
8060 NN=XC\LN
:IF HV<NN THEN NN=HV
8062 FOR I=1 TO NN
8064 NP=TV+INT(I/NN*(HV-TV)+.5)
:LN=LEN(STR$(NP))-1
8070 X=LM*6+2+INT(I/NN*XA)
:PSET(X,55)
8072 P=280+(X-(LN*3)+3)\6
8074 IF P>280+LEN(HD$) THEN PRINT @P,USING
STRINGS(LN,"#");NP; ELSE IF P=280+LEN(HD$) AND
LN<(LEN(STR$(HV))-1) THEN PRINT @P+1,USING
STRINGS(LN,"#");NP;
8076 NEXT
8078 RETURN
8100 SL=INT((D-TV)/(HV-TV)*AL+.5)
:RETURN
9000 OPEN FIS FOR INPUT AS 1
:LL=0
:HV=0
:LV=32767

```

DON'T COMPROMISE!

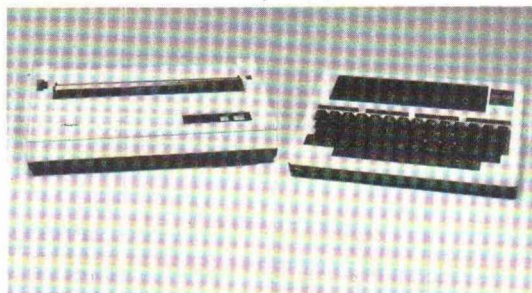
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BAR GRAPH

```

:NL=0
:LINE INPUT #1,LS
9002 C=1
:GOSUB 9500
:IF C=0 THEN 9900
9004 IF C-1>LL THEN LL=C-1
9006 ND=1
9008 CC=C
:C=C+1
:GOSUB 9502
9010 GOSUB 9400
:IF C<>0 THEN ND=ND+1
:GOTO 9008
9012 IF NOT EOF(1) THEN 9002
9014 CLOSE
:TV=0
:IF H=1 THEN 9050
9016 LM=LEN(STR$(HV))-1
9018 IF LM+NL*LL>38 THEN 9900
9020 IF TR=1 THEN TV=INT(LV-3/43*(HV-LV)+.5)
9022 GOTO 9056
9050 LM=LL
:XA=231-LM*6-(LEN(STR$(HV))-1)*3
9052 IF NL>6 THEN 9910
9054 IF TR=1 THEN TV=INT(LV-6/XA*(HV-LV)+.5)
9056 IF TV=LV THEN TV=0
9058 RETURN
9400 V=VAL(MID$(LS,CC+1))
:IF V>HV THEN HV=V
9402 IF V<LV THEN LV=V
9404 RETURN
9500 LINE INPUT #1,LS
:NL=NL+1

```

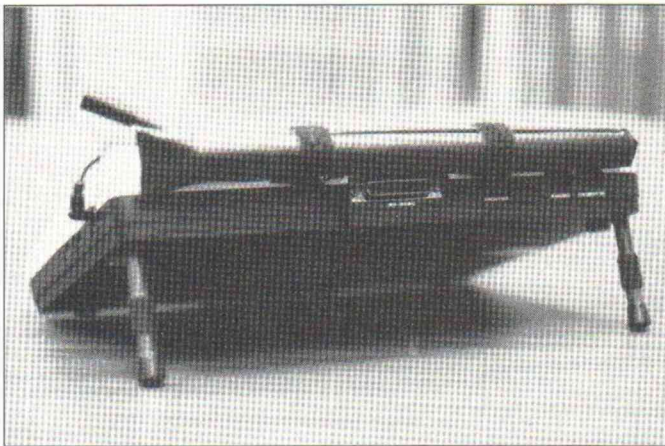
```

9502 C=INSTR(C,LS,"")
:RETURN
9900 CLS
:PRINT
:PRINT "Labels too long."
:GOTO 9950
9910 CLS
:PRINT
:PRINT "Too many labels."
9950 PRINT
:PRINT "Please correct data file and rerun."
:PRINT
:END
60000 CLS
:PRINT @56,"Graph100"
:PRINT @139,"by"
:PRINT @206,"Structured Software Services"
60010 FOR I!=62882 TO 62959
60020 READ N
:POKE I!,N
60030 NEXT
:PRINT @289,"Please press any key...";
:GOTO 900
65000 DATA 58,236,255,6,8,23,245,5,194
65010 DATA 167,245,6,8,241,121,23,79,5
65020 DATA 194,175,245,50,236,255,201
65030 DATA 87,93,205,92,118,14,254,122
65040 DATA 12,12,87,214,50,210,195,245
65050 DATA 6,0,33,67,118,123,23,23,23
65060 DATA 210,218,245,33,77,118,9,71
65070 DATA 205,59,117,120,230,192,178
65080 DATA 71,30,1,33,236,255,205,245
65090 DATA 116,205,60,116,201

```

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PIE CHART (from page 40)

Application	Degrees
Financial	31.3
Word Processing	101.9
Spreadsheets	186.5
Engineering	217.8
Graphics	241.2
Programming	257.0
Training	305.3
Other	360.0

Now, were you planning to draw the pie chart with graph paper, compass and straightedge, you'd have everything you'd need. But the computer needs more. It doesn't really work with angles; its graphics commands (LINE, PSET and PRESET) require precise *x*- and *y*-coordinates.

TO DRAW A CIRCLE

Let's start where PIE.BA does — with the circle. Since the version of Microsoft BASIC in the Model 100 and Tandy 200 doesn't offer a CIRCLE command,

we have to make one the hard way: using trig functions to calculate the coordinates of all the points a given distance from the center of the screen.

What's the distance from the center, or the *radius*, of the pie chart? PIE.BA uses 25 pixels (picture elements, or little LCD dots) on the Model 100 and 50 on the Tandy 200. Where's the center of the screen? On the Model 100, the center is at coordinate (120, 32); on the Tandy 200, at (120, 64). Both sets of values are built into the program; to determine which values PIE.BA should use, enter your computer's model number at line 180.

Let's assume that a line at zero degrees from the center lies horizontally to the right — like a clock hand pointing at 3 o'clock. The laws of trigonometry tell us that the point on the circle of radius RD at angle AN would be:

$$X = 120 + RD * \cos(AN * 2 * \pi / 360)$$

$$Y = 32 - RD * \sin(AN * 2 * \pi / 360)$$

That's for a Model 100; on the Tandy 200, the value 32 would be replaced by 64. The expression $2 * \pi / 360$ is used to convert from degrees (which we learned about in high school) to *radians*, which is the measure that computers prefer to use when dealing with angles. The constant $2 * \pi$ occurs so frequently in PIE.BA that I assigned it to a variable, TP, in line 170.

Now, to draw our pie shell, we could write a loop like this:

Variable	Function
CS	Center of each pie slice
CT	Counter used in FOR/NEXT loops
MD	Computer model, 100 or 200
N\$	Data file name.
NM	Number of data items read
NM\$	Legend and percentage printed
NM\$(20)	Array of data legend names
PC	Cumulative percentage
RD	Radius of the pie graph
SC	Screen center, 32 or 64
TP	Two times pi
TT	Total of all the data values
VA(20)	Array of data values
X1	X-coordinate
X2	X-coordinate used for circle
Y1	Y-coordinate
Y2	Y-coordinate used for circles

Variables used in PIE.BA

```

10 TP = 2 * 3.1415926
20 RD = 25
30 FOR AN = 0 TO 360 STEP 2
40 X = 120 + RD * COS(AN * TP / 360)
50 Y = 32 - RD * SIN(AN * TP / 360)
60 PSET (X, Y)
70 NEXT AN

```

which would plot 180 pixels onto the circle. Oh, it will work — the circumference is only 158 pixels — but this loop took 57 seconds on my Model 100. I found that, because of the limited resolution of the Model 100 display, a 20-sided polygon *looks* like a circle, and takes only 3 seconds. See lines 590-680 for the polygon's program code.

Now that we've got the circle drawn, we can easily figure out how to draw the different segments of the pie. To draw the border for the first segment, which is at 31.3 degrees, use the same equations. The result:

LINE (120, 32) - (141, 18)

By putting the data into an array and using a FOR-NEXT loop, PIE.BA performs this operation for each pie slice on line 790.

Lines 800 and 810 produce the short lines which connect the center of each pie slice to its legend. Line 830, though some tricky manipulations, calculates the place where the legend should start, by converting pixel location to PRINT @ code, and by "backing up" the cursor if the slice is on the left side of the pie.

BAKE IT YOURSELF

As listed, PIE.BA produces a legend for each slice which contains its name and percentage. Here are some changes you can make to line 820:

To print only the legend:

```
820 NM$=NM$(CT)
```


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PIE CHART

To print the legend and raw data value:

```
820 NM$=NM$(CT)+STR$(VA(CT))
```

And to print the percentage to one decimal place:

```
20 NM$=NM$(CT)+STR$(INT(1000*VA(CT)/TT)/10)+"%"
```

If you're in the mood to modify the program, these options could be selected by the user before the actual pie chart is drawn. Another option would be to sort the pie slices alphabetically or by size before drawing the pie.

The data for the pie is stored in any .DO document file. Each slice's information is stored on a separate line, with the legend stored first, followed by a comma and the data assigned to that item. Remember that the total of the slice does *not* have to add to 100.

Finally, pushing any key after a pie is drawn takes you back to the "Please enter the data file name" prompt; pressing Enter or F8 (if normally assigned to Menu) takes you back to the main menu.□

PIE.BA, a program for drawing pie charts on your Model 100 or Tandy 200.

```
100 ' Pie Charts on the Screen
110 ' Alan L. Zeichick for Portable 100
120 '
130 ' Define constants and variables
140 ' =====
150 '
160 DIM VA(20), NM$(20)
170 TP=2*3.1415926535#
180 MD=100
190 IF MD=100 THEN SC=32
   :RD=25 ELSE SC=64
   :RD=50
200 '
210 ' Get the data file
220 ' =====
230 '
240 CLS
250 PRINT "Please enter the data file name, "
260 N$="Menu"
270 INPUT "or Enter to exit: "; N$
280 IF N$="Menu" THEN MENU
290 IF INSTR(N$, ".")=0 THEN N$=N$+".DO"
300 ON ERROR GOTO 450
310 OPEN N$ FOR INPUT AS I
320 ON ERROR GOTO 520
330 '
340 ' Read the data file
350 '
```

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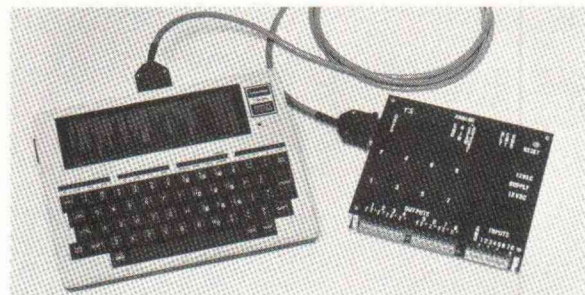
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```

360 TT=0
370 NM=0
380 INPUT #1, NMS(NM), VA(NM)
390 TT=TT+VA(NM)
400 NM=NM+1
410 GOTO 380
420 '
430 ' File not found
440 '
450 RESUME 460
460 CLS
470 PRINT "Sorry, that file doesn't exist."
480 GOTO 250
490 '
500 ' End of input data
510 '
520 RESUME 530
530 ON ERROR GOTO 0
540 '
550 ' Draw the pie outline -- actually a 20-sided
    polygon
560 ' =====
570 '
580 CLS
590 X1=120+RD
600 Y1=SC
610 '
620 FOR CT=18 TO 378 STEP 18
630 X2=120+RD*COS(CT*TP/360)
640 Y2=SC-RD*SIN(CT*TP/360)

```

```

650 LINE (X1, Y1)-(X2, Y2), 1
660 X1=X2
670 Y1=Y2
680 NEXT CT
690 '
700 ' Draw the individual segments
710 ' =====
720 '
730 LINE (120, SC)-(120+RD, SC) ' Base line
740 PC=0
750 '
760 FOR CT=0 TO NM-1 ' Once for each piece
770 CS=(2*PC+VA(CT))/TT/2 ' Calculate total
780 PC=PC+VA(CT)/TT ' Calculate percent
790 LINE (120, SC)-(120+RD*COS(TP*PC),
    SC-RD*SIN(TP*PC)) ' Draw arc
800 LINE (120+.7*RD*COS(TP*CS),
    SC-.7*RD*SIN(TP*CS))-(120+1.2*RD*COS(TP*CS),
    SC-1.2*RD*SIN(TP*CS)) ' Draw inside ptr
810 LINE (120+1.2*RD*COS(TP*CS),
    SC-1.2*RD*SIN(TP*CS))-(120+1.7*RD*COS(TP*CS),
    SC-1.2*RD*SIN(TP*CS)) ' Draw outside ptr
820 NMS=NMS(CT)+STR$(INT(100*VA(CT)/TT))+ "%"
830 X1=(120+1.7*RD*COS(TP*CS))\6+1
840 IF COS(TP*CS) < 0 THEN X1=X1-LEN(NMS)-1 '
    Calculate title position
850 Y1=(SC-1.2*RD*SIN(TP*CS))\8
860 PRINT @40*Y1+X1, NMS; ' Print the title
870 NEXT
880 IF INKEY$="" THEN 880 ELSE 240

```

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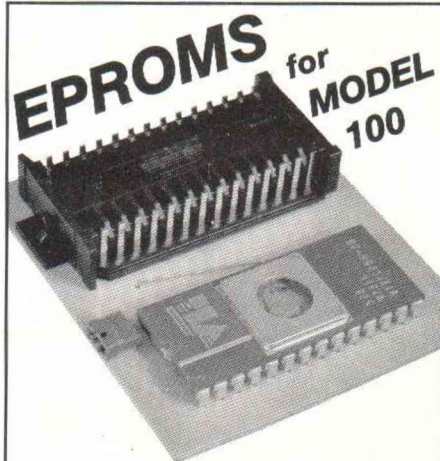
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TS-DOS (from page 9)

DOS user gets to use most of the 29K of RAM for file storage. No need to give up 3.5K for FLOPPY.CO. Instead you leave a much smaller program called DOS100.CO in RAM. When you run it, the bulky part of TS-DOS is brought into RAM from disk. This full size version takes up about 5,246 bytes. It must be stored on each and every data disk you use.

TS-DOS provides a quite civilized in-

TS-DOS

Operating system for
Tandy disk drive
Traveling Software
11050 Fifth Avenue NE
Seattle, WA 98125-6151

206-367-8090

\$69.95 by itself

\$49.95 with Ultimate

ROM II

Circle No. 143

terface between the user and the disk drive. Where FLOPPY.CO requires you to type in the names of the source and destination files in RAM and on disk, TS-DOS lets you move the cursor among the displayed file names and transfer the file with a single keystroke.

A subset of TS-DOS, taking up about 2,720 bytes, may be left in RAM, allowing easy access to the floppy disk from TEXT or BASIC. (MAXRAM gets set to 60240.) File access is sequential (you can't read, say, only the twentieth record) and only one disk file may be open at a time.

The TS-DOS subset fits neatly into the existing RAM file-management routines of the computer. When it's installed, you can move files to and from disk simply by using the "Save" and "Load" keys in TEXT.

For example, you've just typed a large text file into the Model 100 and you want to store it to disk. Press F3 and the prompt "Save to:" appears. (This is the same function key that you would use to store the file to cassette.) Type in a file name preceded by a device specification of "0:", something like "0:ARCTIC.DO", and hit Enter. The drive whirs quietly and stops. The file is now on disk. All without leaving TEXT.

Later you want to load the file back into the computer. You enter TEXT, push F2 ("Load from:") and type "0:ARCTIC" again. The drive whirs and your file is back in RAM.

The resident portion of TS-DOS also

lets you read from and write to disk using OPEN, INPUT and so on. Other commands such as LOADM, SAVEM, LOAD, and SAVE may be used with the "0:" device to gain access to the disk.

INSTALLATION

The TS-DOS package comes with a manual, cassette and a 3.5 inch floppy disk containing the software. Installation is fairly simple although it's assumed you've already mastered the FLOPPY.CO program that comes with the Radio Shack disk drive.

To run the software you must put the TS-DOS disk in the drive and use FLOPPY.CO to load a small file called TS-DOS.CO into the computer. Then you run TS-DOS to load the entire operating system (called DOS100.CO) into the computer. Next you make backups of the TS-DOS disk and copy portions of TS-DOS and DOS100.CO onto other data diskettes. Finally you may erase FLOPPY.CO from your computer.

If you have Ultimate ROM II you won't need to run FLOPPY.CO. Ultimate ROM II has a menu item called TS-DOS. If you select it you can get TS-DOS from disk directly. Nothing special needs to be in RAM to use the disk.

TS-DOS cannot be relocated. It has a certain region of high memory all picked out and won't run anywhere else. This means you cannot use, say, a bar code driver and the resident portion of TS-DOS simultaneously. If you use few other machine language programs, it won't be much of a problem.

TS-DOS seems to be quite tidy in its use of RAM hooks and high memory. It's unlikely it will accidentally cause a cold start. Nonetheless, you should make backups of your RAM files periodically. You have no excuse not to since the disk drive makes it so easy.

The 30-page manual I received was a preliminary version. Although the table of contents listed a nonexistent index, it was well written and comprehensive. It assumes (and I think fairly) that you're familiar with the operation of the floppy drive and the use of the FLOPPY.CO program.

As for support, I called Traveling Software several times and someone was always there to answer my questions.

TS-DOS is a great improvement over FLOPPY.CO and makes Tandy's portable disk drive more powerful. □

— By Carl Oppedahl

600 with a printer cable, turn on the printer and press Escape. In the Command mode, press "P" for Print. Another menu will be displayed on the screen.

You'll be asked where to direct the output. You have three choices — PRN for a printer, COM for the RS-232 communications port or CON for the console screen.

The Print menu also asks you to supply the number of copies you want printed and whether you want all pages in a document printed, or just a certain number. Anyone who has ever worked with a word processor that doesn't allow printing of certain pages will appreciate this feature. You can select a range or individual pages.

Be warned that the Microsoft Word in the Tandy 600 is not the full-featured Microsoft Word that Macintosh owners have grown to love. Not only does the laptop version lack a mouse (fortunately), it can't do windows. In any event, it would be hard to imagine splitting the small screen to look at more than one text file at a time. It's not much of a disadvantage.

The secret of multiple file work in the Tandy 600 lies in the fact that you can quit one file and go to another almost instantly. The Word program is always resident in the system and doesn't need to be constantly read into memory. As a result, switching back and forth between programs or files is a relatively easy matter.

I'm writing a rather complex and lengthy book that requires numerous notes. Using embedded codes, the word processing program I normally use offers automatic numbering and note placement. It has a limit on note length which I usually exceed, and a format I don't like and can't customize. So I've had to jerry-rig my own method for writing longer notes using the program's split screen capability and creating a separate note file with an undented format.

It turns out that with Word, I can do almost as well embedding my numbered notes in brackets right in text, then gathering them in sequence using Search, deleting to the Scrap set to the Append mode and finally inserting Scrap in a separate note file.

WHERE THERE'S A WILL

The one thing that seemed to be missing in Word was a way to print superscript numbers to indicate the notes in the text. Nowhere in the manual could I find instructions for so-

called typeface commands. If I hadn't been an experienced Model 100 user, I would have been at a total loss. But I knew that by using Tandy's unique graphics-generating keyboard, I could create symbols that would translate into the Escape Codes that drive most printers.

On my Juki 6100, for example, the code to turn on underlining is Escape-E and to turn it off is Escape-R. Escape-E is 197 in ASCII decimal code which converts to Ctrl-Alt-N on the Tandy 600. Escape-R is 210, which on the Tandy 600 is Ctrl-Alt-3. To tell the printer an Escape code is coming, you must precede each of these codes with the ASCII code for Escape itself: 155, or Shift-Alt-4. So to underline a word, you must type Shift-Alt-4, Ctrl-Alt-N, the word to be underlined, Shift-Alt-4 and then Ctrl-Alt-3.

It's easier than it sounds. Do it a couple times and it becomes second nature.

All codes show up on the screen as non-printing graphics characters. It's important to remember that before each code you must type the ASCII equivalent for Escape — but in no event should you hit the Escape key itself. Each printer has its own codes, although many printer brands share codes. Epson codes are a standard among dot-matrix machines. The Epson codes given for the Model 100 can be converted using Appendix D (ASCII Character Codes) in the Tandy 600 manual.

My experience so far is that Word's power tends to expand in surprising ways to fit the writer's needs. Much of this built-in flexibility comes from the Format Paragraph command and its ability to create different formats within one document. For example, I can format an article to leave room for small pictures or diagrams or I can indent single-spaced quotations within double-spaced articles.

There are only two traditional word-processing functions that I truly miss in Word. There's no provision for transposing words or letters with a control or function key, nor is there any way to toggle between upper and lower case. In both instances, you must delete the offending letter or word and retype accordingly.

My strongest criticism, however, goes to the instruction manual which is woefully inadequate for first-time computer users, evidently an important market for the Tandy 600.

Despite these minor drawbacks Word is in a word, wonderful.□

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Exp. Date _____

SPREADSHEET (from page 23)

lums. The first two, columns A and B, are nine characters wide. Columns C and D are four characters wide. The remaining columns, E through K, are seven characters wide. Remember the column width should be set prior to developing the headings and title block.

As in our examples above, type the name of this file in cell A1. In B1, input your initials and those of the user. Since this report could be updated daily, move the cursor to A3, press F1, then Control D for the current date.

Now we come to the title block. Our example report is 75 characters wide, making the center at 38. Center the title the same way as you did in the accounts receivable example. Use two lines for the title: The top line for the name of the report and the second line for the month it covers.

The sales journal will require the following headings. Refer to the sample sales journal for layout.

INV DATE	(Column A)
CUSTOMER	(Column B)
INV NO.	(Column C)
PROD NO.	(Column D)
TRADE SALES	(Column E)

MSTRAR gg/br									
Feb 24, 1986									
ACCOUNTS RECEIVABLES									
Aging by Customer									
CUSTOMER	INV NO.	AMOUNT	AGE	0 TO 30	31 TO 60	61 TO 90	OVER 90	LTR	
CUST 1	1111	100.00	30	100.00	0.00	0.00	0.00		
CUST 2	2222	150.00	60	0.00	150.00	0.00	0.00		
CUST 3	3333	200.00	90	0.00	0.00	200.00	0.00		
CUST 4	4444	250.00	91	0.00	0.00	0.00	250.00		

The aging report is virtually identical for both accounts receivables and payables. Simply change the appropriate title and column headings — the formulas stay the same.

MSTRSJ gg/jrr									
Feb 25, 1986									
SALES JOURNAL									
Month of Jan									
INV DATE	CUSTOMER	INV NO.	TRADE CODE	TRADE SALES	C.D.S. A	SALES PROD	SALES PROD	C.D.S. PROD	C.D.S. PROD
						1	2	1	2
01/05/86	CUST 1	11	1	55.00	25.00	55.00		25.00	
01/10/86	CUST 2	22	2	35.00	18.00		35.00		18.00
01/10/86	CUST 2	22	3	5.00					5.00

A sample sales journal. It's used to calculate sales and cost of sales by product.

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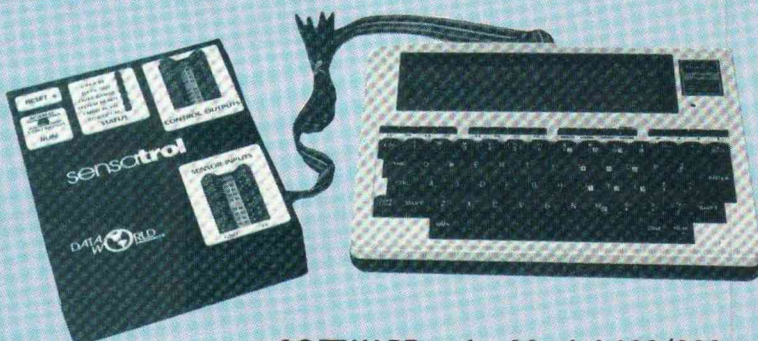
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SPREADSHEET

TRADE C.O.S.	(Column F)
SALES PROD A 1	(Column G)
SALES PROD B 2	(Column H)
C.O.S. PROD A 1	(Column I)
C.O.S. PROD B 2	(Column J)
FREIGHT 3	(Column K)

It's important to note that the numbers 1, 2 and 3 in the column headings for G through K should be entered as numeric values. They represent the product numbers that will be entered in column D. Columns G through J represent sales and the cost of sales for each product in our product line. Make a note of which cells the products numbers are located in the headings because they'll be used in our formulas.

Before we get into the detail of what each column is and how the report works, let's input the formulas we'll need. Starting at the top of column G (under SALES PROD A 1), type in the formula $+(D*=\$G**)\&(D*>\$G**)-E*$ where "*" is the current row number and "**" is the row location of the product number in the column heading. Copy the formula down the column for as many entries as necessary. Be sure to use the \$ in front of G since it is always constant.

The formulas for the remaining columns are similar:

- for column H:
 $+(D*=\$H**)\&(D*>\$H**)-E*$
- for column I:
 $+(D*=\$I**)\&(D*>\$I**)-F*$
- for column J:
 $+(D*=\$J**)\&(D*>\$J**)-F*$
- for column K:
 $+(D*=\$K**)\&(D*>\$K**)-E*$

Copy each formula down the column as necessary.

The formula in column G compares the PROD NO. in any cell in column D with the number in the column G heading — in this case the number one. If the PROD NO. (D*) is equal to and not greater than the number in column G's head (G**), the negative value of the corresponding cell in column E (TRADE SALES) is printed in column G. If the number in D is not equal to and is not greater than the value in G**, a zero is printed in column G.

In order to fully understand each of the columns, input some data across one row. Refer to the Sales Journal example. In column A enter the date the invoice was written. Column B is for the customer's name. The invoice

number goes in column C. Companies usually sell more than one product, and each product usually has its own product number. This number is entered in column D and corresponds to the number in the column headings in G through K. Column E is the actual amount of the invoice for this product. Invoices are usually for more than one product, so you will have a line for each product listed on the invoice.

If the product is manufactured by you, the accounting department will have a cost of sales established for each product. This will include labor, and both variable and fixed overhead. This figure times the number of units shipped is input for column F.

Column K is for the freight cost to ship the product. Some customers pay the freight, so we have a separate freight account; it therefore needs its own product number.

Total each of the columns E through K. This total figure is transferred to the flash report.

FLASH REPORT

The flash report is simply a weekly activity summary. It's a spreadsheet

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SPREADSHEET

COMPANY FLASH REPORT									
WEEK ENDING: XX/XX/XX				CURRENT WEEK			MONTH TO DATE		
SALES				-----			-----		
PROD A									
PROD B									
PROD C				-----			-----		
TOTAL SALES				=====			=====		
COST OF SALES (STD \$)									

PROD A									
PROD B									
PROD C				-----			-----		
TOTAL COST				=====			=====		
TOTAL INVENTORY BALANCE									

BEG BAL									
END BAL									
TRADE RECEIVABLES AGING (\$)									
-----				Past due (days)					
TOTAL				1 TO 30	31 TO 60	61 TO 90	OVER 90		

TOTAL ACCOUNTS PAYABLES AGING									
-----				Past due (days)					
TOTAL				1 TO 30	31 TO 60	61 TO 90	OVER 90		

The flash report summarizes the week's activity.

that uses the REF function to print totals from other spreadsheets. The referenced spreadsheet must be in memory at the time. If memory space is a problem, a simple copy and paste will work just as well.

The flash report gives us sales by product area, cost of sales by product and both A/R and A/P dollars by age period. The sales and cost of sales come from the sales journal. Receivable and payables aging are from the two reports we just did.

I hope the use of the IF/THEN logic in this spreadsheet has fueled your imagination. Thoughts, comments and other suggestions are welcome. Write to me in care of Portable 100, P.O. Box 250, Camden, ME 04843.□

mathematical series: $1 + 1/3 + 1/9...$ which eventually adds up to 1.5. Therefore, theoretically you can increase your memory by a factor of 1.5 (or 50 percent).

There's one problem with this way of thinking, however. Only the smallest file can be expanded and edited — unless of course you either kill the other files or move them to another memory bank or disk drive.

I looked at it in a different way. I'm a Model 100 user with no add-on random access memory (RAM) banks or floppy disk drive. I simply have a 32 kilobyte (K) computer and a cassette recorder. I use the machine for word processing and want to be able, at a moments notice, to edit any files in the computer. How much more text can I fit into memory with the help of Lap Coder?

For my purposes I must limit file size so that if all files are compressed there's enough free memory to expand and edit any file at any time. Assume I have three files of equal length where one is expanded and the other two compressed. To fill my 29K of memory, I can have an expanded 12,400 byte file and two compressed 8,300 byte files. As long as at least two files are compressed, there's enough room to expand any of the three files.

So how much RAM has been effectively added? If expanded, the three files would fill about 37,200 bytes of memory. Compared to the approximately 29,000 bytes available on a 32K machine, that's an increase of about 28 percent. This is a more realistic figure than the 50 percent suggested by Mu-Psi.

OTHER BENEFITS

A compressed file can be saved to tape or disk and reloaded in less time than its full-sized equivalent. It can also be sent over the phone lines in less time. A 29K file would require about 16 minutes to send at 300 bits per second (BPS). Compression cuts the time to just under 11 minutes.

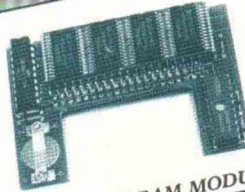
Nothing comes free, of course. The compressed file requires eight data bits and cannot be sent with parity checking, while the expanded file requires only even bits and allows parity checking. Obviously if you don't use parity this is no loss.

Lap Coder, running in machine language, is fast and easy to use. If you do a lot of text processing it will save you memory, time and thereby money. □

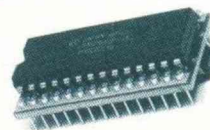
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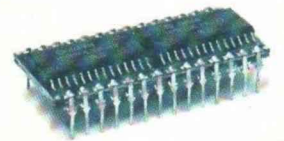
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Is it Integer or is it Real?

Last month, we took a look at different ways of turning real numbers (those with decimal points) into integers. But that raises the question: Is it better to use integers whenever possible?

PERSONAL SPACE

Let's start with a subject that's pretty dear to our hearts — random-access memory (RAM). Whether your computer has 8K, 24K, 32K or even a multi-bank RAM expander, we all know that isn't enough. To paraphrase an old expression, "Program size expands to fill available RAM."

To cut down on RAM usage, and also to speed program execution, the Model 100 and Tandy 200 offer several types of numeric variables: integers, single-precision reals and double-precision reals. Briefly, these are the differences:

Type	Suffix	Accuracy	Bytes	Speed
Integers	%	5 digits	2	Fastest
Single	!	6 digits	4	Slower
Double	#	14 digits	8	Slowest

Programmers use all three types of numbers — integers are best for counting, while double-precision numbers are useful in math calculations.

As a general rule when programming, it's a good idea to use the least accuracy you'll need for a given application. Unfortunately, BASIC assumes that all numbers are double precision unless told otherwise — so whenever you program, put this line at the very top:

```
10 DEFINT A-Z
```

This tells the computer to use integers — that is, whole numbers between -32,768 and 32,767 — for all calculations. But that may not be what you want: If you're dealing with dollars-and-cents numbers, for example, you'll need decimal places. Assuming you've decided to make all your variables dealing with dollars start with the letter D, you can modify line 10:

```
10 DEFINT A-C, E-Z:DEFSNG D
```

Or, you can append each decimal

variable's name with an exclamation point, as in *DL!*. I prefer the first method of defining variable types right off the bat and sticking with meaningful first letters. Perhaps that's a hold-over from my Fortran days, but that eliminates the bytes consumed by punctuation marks — as well as the hazard of leaving one off accidentally.

Variable type is especially important when dealing with arrays. Take an 100-element array — how much space does it consume? Let's find out.

```
10 DEFINT A
20 Z = FRE(0)
40 PRINT Z - FRE(0)
```

The FRE(0) function tells us the amount of free RAM currently available. Running this program produces the result 6 — that means that the assignment consumes six bytes. To adjust, change line 40 to PRINT Z - FRE(0) - 6.

Here's a look at the memory used with different dimension statements in line 30:

Dimension	RAM consumed
30 DIM A%(100)	210 bytes
30 DIM A!(100)	412 bytes
30 DIM A#(100)	816 bytes

Now imagine if you were using a multi-dimensional array, such as a 20-by-20 element matrix. A program that could run safely with integers might be altogether too large to fit within a Model 100's RAM with the default double-precision numbers.

TOTALLY RANDOM

Random numbers? They're just useful for games with dice, aren't they?

Not really. In the computing world, unpredictable numbers are used for sample data, testing programs and "Monte Carlo"-type algorithms.

Let's say that you want to write a program that will be performing statistics on numbers. When it's time to test the program, you don't want to make up 2,000 fake numbers — let the computer do the work!

A key to random numbers is making the numbers *exactly* to your specifica-

tion. If you need integers between 1 and 10, the statement

```
A = INT(RND(1)*10)+1
```

will produce those numbers. Why? The RND function returns real numbers which range from exactly zero to just a little bit less than one. In mathematical notation, this would be:

$$0 \leq \text{RND}(1) < 1$$

To move the range of numbers, first find out exactly how many possibilities the application needs. There are ten integers in the range of zero to 10, so multiply the inequality by 10:

$$0 \leq \text{RND}(1)*10 < 10$$

We don't want the less-than on the right. So, use the integer function on the inequality:

$$0 \leq \text{INT}(\text{RND}(1)*10) \leq 9$$

Then, add one to ensure that the function will return an integer in the range zero to 10.

Let's generalize. The multiplier is equal to the largest possible integer less the smallest possible integer plus one ($10 - 1 + 1 = 10$), and the number added at the end is equal to the smaller integer (1).

If we want to produce random numbers between -10 and +10, our multiplier would be $(10 - -10 + 1)$ or 21. And we should add a -10:

```
A = INT(RND(1)*21)-10
```

In the equation above, you can use either the INT or FIX function.

Some programmers prefer to place the -10 inside of the INT function, but that leads to a complication. What if the RND(1) function produced a 0.01, for example? The product of 0.01 and 21 is 0.21, and subtracting 10 results in -9.79.

The expression FIX(-9.79) simply truncates the decimal places, resulting in a final random number of -9. But the function INT(-9.79) applies the function *nearest integer less than or equal to* the value, and produces the correct random number, -10.

You can use either form of the random equation — but I prefer the first version, since it's immune to errors caused by the use of FIX.

— Alan L. Zeichick



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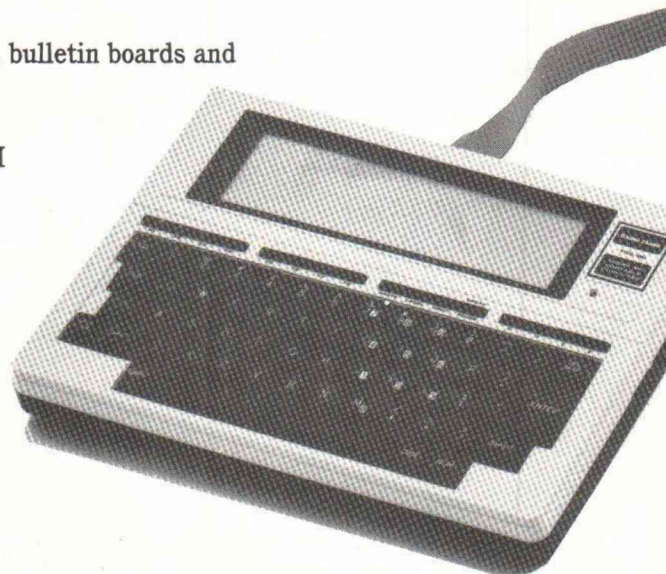
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